

AMERICAN ARTISAN

AUGUST 1953

90th Year

RESIDENTIAL AIR CONDITIONING • WARM AIR HEATING • SHEET METAL CONTRACTING

Cover Picture

EVAPORATIVE COOLER
installations for duct distribution of conditioned air blend well with architectural designs
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manual used to estimate the heat gain for a contemporary house page 56

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• CONVENTIONS —

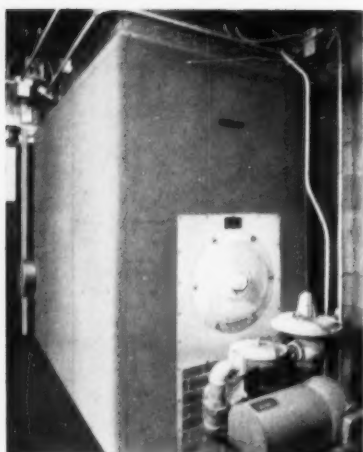
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JACKSON & CHURCH FURNACE + SUMMER COOLING = pleasant shopping



The modern Sams Brothers ladies apparel store,
Bay City, Michigan.

A need for dust-free, even temperatures to protect delicate fabrics and provide shopping comfort for patrons of this modern ladies apparel store called for a carefully engineered heating system.

By providing an equally modern furnace, a Jackson & Church dealer solved all problems. (J-C systems lend themselves ideally to summer cooling.)

A J-C PowerRated furnace was installed . . . and after actual use in all seasons for two years, the owners of the building say this about their J-C PowerRated unit:

"The decision to offer summer air conditioning to our patrons and employees by utilizing fully a Jackson & Church warm air system certainly has been justified. The quietness and cleanliness of operation during both winter and summer has made this store a favorite place to shop. Comfort in our store has been reflected in our sales."

*from a statement made by
the owners of Sams Brothers*

J-C PowerRated units provide dependable heat in one "package". Job-specified to meet big heating requirements from 380,000 to 3,800,000 Btu output. Basement models are available in outputs of 50,000 to 320,000 Btu, suspension models from 80,000 to 1,000,000 Btu.



JACKSON & CHURCH CO.

SAGINAW, MICHIGAN

Work well done since eighty-one

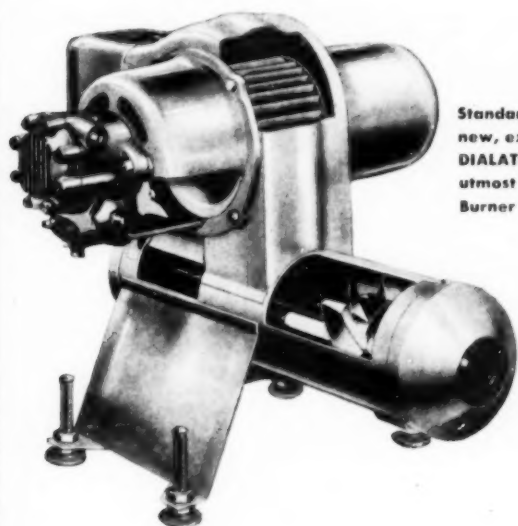
What **FEATURES**

do you want most in
the lines you sell?

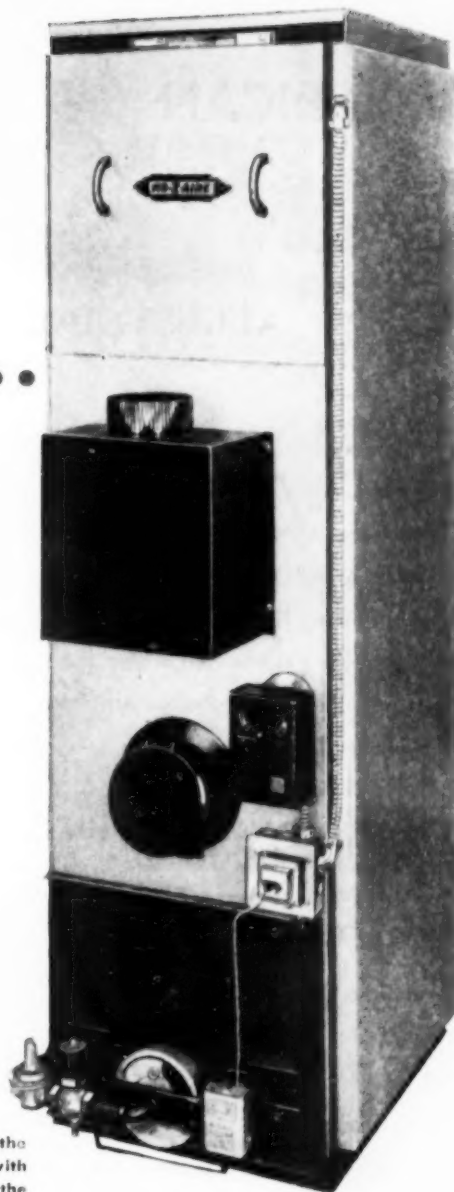
KO-Z-AIRE Dealers find these 7 features make
their selling easier year after year . . .

1. Quality construction . . . engineered for years of trouble-free operation
2. Attractive cabinets with baked enamel finish
—Ideal for any surroundings, easy to keep clean
3. Designed for High Heating Efficiency
4. Economical Operation with either gas or oil
5. Engineered for Easy Installation
—Most units shipped completely assembled and wired
6. A size for Every Home—70,000 to 420,000 BTU input
—KO-Z-AIRE'S complete gas and oil lines helps you
close more sales . . . make more money!
7. Easy Convertibility
—from oil to gas or gas to oil

Plus Faster, more experienced field assistance and service to KO-Z-AIRE
dealers and distributors. For more and faster sales . . . bigger profits . . .
line up with KO-Z-AIRE. Why not get all the facts and figures? Start now
by mailing the coupon below.



Standard on all KO-Z-AIRE oil units is the
new, exclusive KO-Z-AIRE Oil Burner with
DIALATROL — giving your customers the
utmost in fuel efficiency. Conversion
Burner available in sizes 0.75 to 12 gph.



more than 35 models

LO-BOYS • HI-BOYS • COUNTERFLOWS • GRAVITIES

KO-Z-AIRE PRODUCTS, Inc. Red Oak, Iowa

Dipl. A¹ B

Please send us details on

- ☐ KO-Z-AIRE Counterflows
- ☐ KO-Z-AIRE complete line of Oil and Gas Equipment
- ☐ Have your factory representative call.

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STREET _____

CITY _____ STATE _____

KO-Z-AIRE

PRODUCTS, INC.

Factory and Sales Office—Red Oak, Iowa

mail the coupon

AMERICAN ARTISAN

AUGUST 1953

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Founded 1864

Volume 90 No. 8

**RESIDENTIAL
AIR CONDITIONING •**

WARM AIR HEATING

SHEET METAL CONTRACTING

Merged with American Artisan are "Warm Air Heating" and "Furnaces and Sheet Metals"

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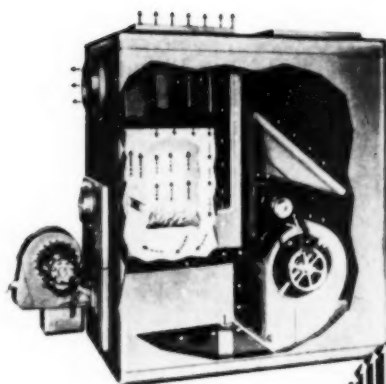
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Syncromatic

Means Peak Efficiency

FROM
70,000 Btu's.

Gas



500 SERIES
OIL or GAS FIRED
LO-BOY - COUNTERFLOW - HI-BOY



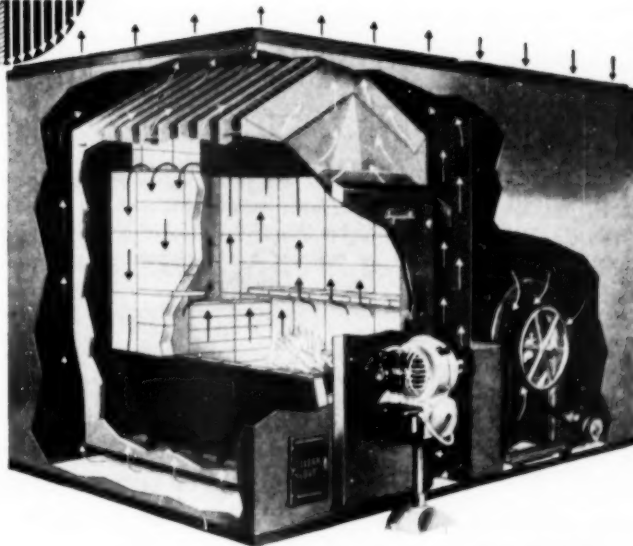
With

Oil or

TO
1,000,000 Btu's.

FROM THE SMALLEST HOME
UNIT TO THE LARGEST
COMMERCIAL FURNACE
YOU GET THE SAME MATCH-
LESS QUALITY

1. Unequaled counterflow heat transfer design.
2. Heavy gauge long lived heat exchanger.
3. High combustion efficiency with all fuels.
4. Quiet operation.
5. Superbly designed furnace casing.
6. The best materials money can buy.



HI-CAP SERIES
OIL - GAS or COAL FIRED

BY MAINTAINING THESE QUALITIES IN EVERY FURNACE BUILT, SYNCROMATIC HAS SET A STANDARD IN WARM AIR HEATING EQUIPMENT THAT IS HARD TO EQUAL.

FOR COMPLETE INFORMATION SEE YOUR NEAREST SYNCROMATIC WHOLESALE OR WRITE
SYNCROMATIC CORPORATION
WATERTOWN, WISCONSIN.

the editor's notebook

Cites Changes in Field Over Past 50 Years

E. G. DREW, Drew Engineering Co., Portland, Ore., has sent in from his files a book that was published by American Artisan in 1900. It is interesting to note the changes that have taken place in the sheet metal field over a 53 year period. One ad mentions over 100 sheet metal patterns that range from a two pint tea pot to a 7½ in. square elbow, with grocers scoops, milk pails, churns and dish pans in between. All of the shop tools illustrated are manually operated and in one ad is shown a journeyman sheet metal worker (derby and all) carrying a cornice brake to his work on the largest railway station in the world — at Boston.

The text outlines many of the techniques used in those days to fabricate the elaborate designs that were popular at the turn of the century.

Four Point Program for Selling

ROBERT F. MARKS, heating salesman in the Detroit area, said in a recent interview that he attributes his large volume of orders to one primary factor—sustained missionary work with consulting engineers, architects and contractors. He believes that the whole question of successful selling boils down to four points:

1. Early contacts and good liaison work with consulting engineers and architects.
2. First-class job presentations, with complete quotations, for mechanical contractors or property owners.
3. Immediate follow-up of presentations with sales talks.
4. Good installation work and service.

Mr. Marks is with Comb



Enthusiastic reception by the public explains the higher sales frequency of the Sundstrand all-electric oil burners.

With a Sundstrand, the most modern concepts of warm air heating are realized.

... That's not enough; with a Sundstrand, initial low-cost is matched by long-span oil burner performance.

... These values and the Sundstrand reputation for the finest in oil heating add up to complete customer satisfaction. Foot or bracket mounted, all Sundstrand oil burners are listed as standard by Underwriters' Laboratories . . . and meet all state and local requirements.

A leader in oil heating for 33 years.

write to

SUNDSTRAND ENGINEERING CO.
ROCKFORD, ILLINOIS

the editor's notebook

(continued)

& Groves, Inc., handling the sale of Iron Fireman heating apparatus.

OHI Gives Tips To Salesmen

"NEVER judge a prospect by the looks of his house," Oil Heat Institute suggests to salesmen, in a recent bulletin. "Small houses are often the ones most in need of new oil burner equipment."

OHI gives three good rules for selling: know your business; believe in it; be enthusiastic about it.

Average Home to Have All Year Conditioning

YEAR 'ROUND push button weather control is rapidly approaching the reach of the average American pocket-book, according to Clarence H. Linder, vice president of engineering, General Electric Co.

Speaking at the 40th semi-annual meeting of the American Society of Refrigerating Engineers, Mr. Linder predicted that 200,000 heat pumps will be sold annually by 1960 at an installed price of less than \$2000. This compares with today's installed price of about \$3500 to \$4500 in a few thousand luxury homes throughout the nation.

Mr. Linder told the refrigerating engineers, "Few industries can look forward to a future as bright as yours." Tracing the rapid growth of air conditioning, he said it has the potential of becoming one of the fastest growing industries in the country during the next quarter of a century. He said sales of room air conditioners alone, reported at less than a half million units last year, would approximate 2 million units annually by 1960.

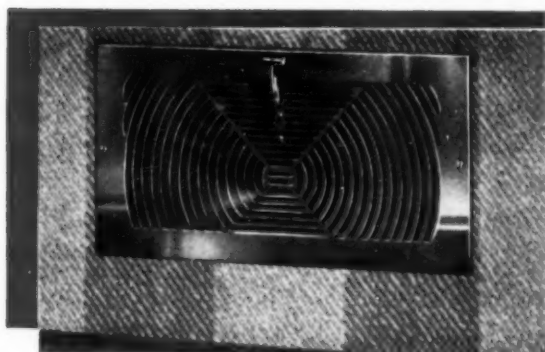
Mr. Linder also warned



Diffusaires

PROVIDE THE IDEAL AIR DISTRIBUTION
for **PERIMETER HEATING and COOLING**

*At $\frac{1}{5}$ to $\frac{1}{8}$ the cost of Continuous
type Diffuser Installations!*



H&C No. 40 is the most practical sidewall diffuser on the market. Provides 180° spread of air to blanket the wall of the average room. It's exceptionally low in resistance and has positive means of balancing the system at the register face.



No. 311 is definitely superior to other diffusers in this class. It has opposed covers for undistorted airflow, regardless of volume; quick, positive volume control for balancing at the face; curved diffusion vanes for ideal air pattern; foot-operated, trouble-free valve control.

At a recent conference of air conditioning experts the consensus was that introduction of air in such a manner as to blanket the outside wall had proved the most satisfactory, draft-free method of not only heating but also cooling. And that is exactly what the two H&C DIFFUSAIRES do! Either of them will completely blanket the wall of an average room . . . which means that either of them will provide this primary essential of draft-free heating or cooling at one-fifth to one-eighth of the cost involved with the more expensive continuous baseboard type diffusers with their lesser coverage and greater duct-outlet requirements. For top-notch results and the kind of economy that really counts, use H&C DIFFUSAIRES. See your H&C Jobber or write for complete descriptive and engineering data.

HART & COOLEY

300 EAST TIGHEN ST., HOLLAND, MICH.

In Canada Hart & Cooley Manufacturing Co., Ltd. 100, Queen St. W., Toronto



MANUFACTURING CO.

PRODUCT OF THE WORLD'S LARGEST and MOST PROGRESSIVE PRODUCERS OF REGISTERS and GRILLES

the editor's notebook

(continued)

the engineers of the seriousness of the engineering shortage. He said that before the bright future of their industry can be fully realized, they must first insure that they have enough engineers available to continue the program of creative and imaginative engineering. He urged the refrigerating engineers as individuals, "to do a public relations and selling job such as has never been equalled," in an attempt to attract capable young men and women into the engineering profession.

Home Mortgage Lending Rises

DURING the first quarter of 1953 home mortgage lending (\$4419 million) exceeded by a substantial amount the volume recorded for the same period of 1952 (\$3962 million), according to the United States Savings and Loan League. Gains were reported by savings associations, commercial banks and trust companies, mutual savings banks, individuals and other lenders.

For the period 1946-1952 the percentage of VA guaranteed and FHA insured home mortgage loans financing new construction was slightly higher than the percentage of such loans for existing homes. However, for the same period, savings associations made many more mortgage loans for existing homes than for new buildings. Percentages of mortgages issued for new and existing homes during the period are as follows:

VA guaranteed home mortgages: new construction, 52.4 per cent; existing homes, 47.6 per cent.

FHA insured home mortgages: new construction, 59.8 per cent; existing homes, 40.2 per cent.



IF
you can find
a cubbyhole in a house —
you can sell a



The SUN line of oil- and gas-fired automatic furnaces includes a wide range of sizes and capacities — from the large industrial installation of 224,000 Btu down to the pint-size HI-BOY that will fit into any closet or cubbyhole. The tiniest home is a prospect for the compact, space-saving HI-BOY.

The SUN line is backed by over 50 years of experience in furnace design and manufacture so when you install a SUN FUEL-MASTER you know you are delivering the utmost in heating satisfaction and long life.

P. S. If you haven't seen the latest



ask for full details.



the editor's notebook

(continued)

Savings associations: new construction 37.4 per cent; existing homes, 62.6 per cent.

[Sources for these figures include the Home Loan Bank Board, Federal Housing Administration, and the Veterans Administration.]

Demand for Steel Still Near Capacity

JOSEPH L. BLOCK, president Inland Steel Co., told stockholders that he expected operations to remain at near capacity for the rest of the year.

Gas-Fired Equipment Shipments Rise

INDUSTRY SHIPMENTS of gas-fired central heating equipment in April, 1953, were well above shipments of April, 1952. The sharpest increases were evidenced by gas-fired furnaces which were up 42.4 per cent and gas conversion burners which increased 33.3 per cent. Overall shipments of gas-fired central heating equipment increased 13.7 per cent over the first four months of last year.

Shipments of gas-fired furnaces for the first four months of 1953 totaled 131,700 as compared to 101,200 shipped in 1952. Gas conversion burners shipped in the first four months of this year amounted to 42,600.

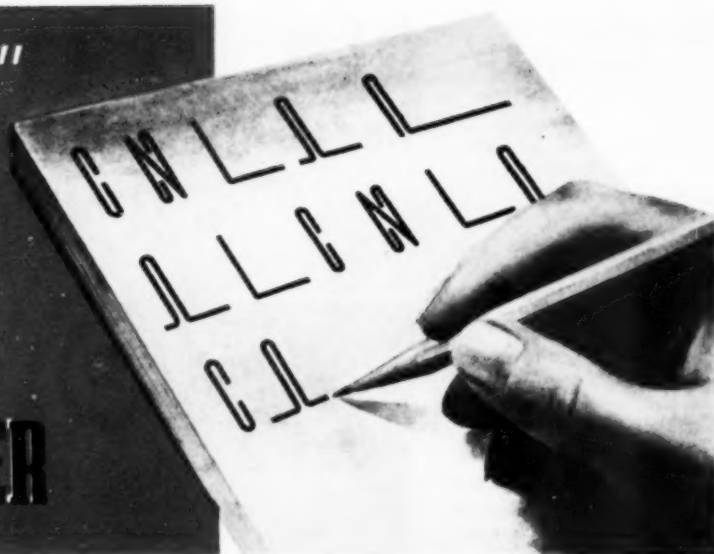
Oil-fired burner installations totaled 143,560 for the first four months of 1953.

Stresses Value of Home Modernization

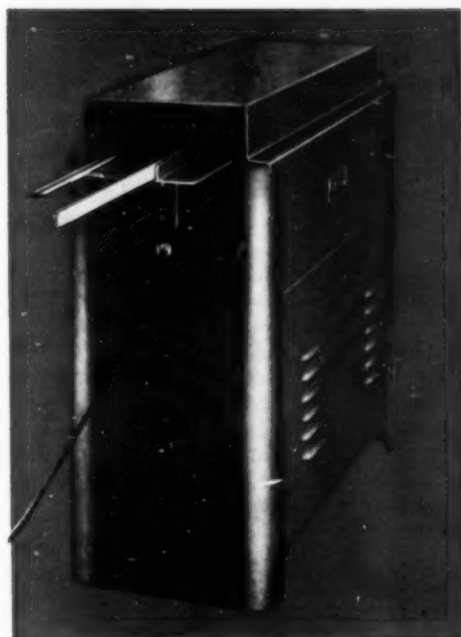
MODERNIZATION and rehabilitation of existing homes is of utmost importance to the mortgage lender who seeks the greatest possible security for his loan.

This was emphasized by

not "SHORT HAND"
but
money-making
"SHORTCUTS" by
CLEATFORMER



Cleatformer means fast, foolproof fabrication at lowest costs! Versatile and efficient, Cleatformer turns out Double Hem "S" Cleats, Drive Cleats, "T" Connections, Standing Seams and Right Angle Flanges with a speed and uniformity that means extra profit in all production. The Double Hem "S" Cleat, made by the built-in rolls, is many times stronger than the conventional "S"—permits use of lighter gauges with no sacrifice of stiffness—makes the use of much longer cleats practical—speeds fabrication—makes better looking, neater assembly—can also be used as a snap lock. When installed, it exactly matches the Drive Cleat made by the 3-in-1 Rolls.



Cleatformer Auxiliary 3-in-1 Combination Rolls are interchangeable with Drive Cleat Roll. These Rolls produce the Right Angle Flange, Standing Seam and "T" Connection . . . all three of these forms . . . without any changeover being necessary. Installation of these 3-in-1 Rolls is simple and fast . . . Drive Cleat Rolls may be replaced at any time and operation in no way interferes with "S" Cleat forming.

Write Today for the New Lockformer Catalog



THE LOCKFORMER CO.

4615 WEST ROOSEVELT ROAD • CHICAGO 50, ILLINOIS

the editor's notebook

(continued)

George C. Johnson, president, Dime Savings Bank of Brooklyn, discussing the value of the open-end mortgage in a recent issue of the National Association of Home Builders' *Correlator*. He urged that this type of mortgage be used when possible to benefit both property owners and lenders.

"It is fundamental reasoning", Mr. Johnson said, "that a property in good repair, and in modernized or enlarged condition, represents a greater security for the mortgage lender."

PAD Estimates Oil Refining Capacity

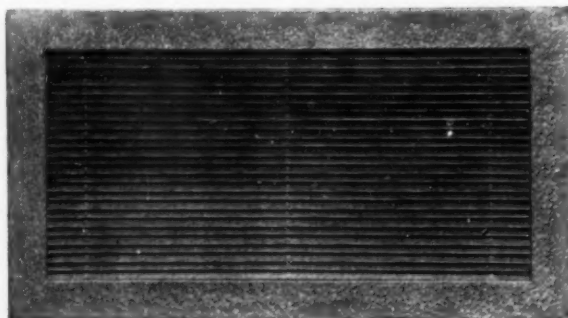
CRUDE-OIL refining capacity in the United States is expected to reach a total of about 8,100,000 barrels a day by the end of 1953 and about 8,400,000 barrels a day by the end of 1954, according to revised estimates of the Petroleum Administration for Defense. An additional 62,000 barrels a day of new refining capacity is scheduled to be completed after January 1, 1955. Refining capacity on January 1, 1953, was estimated by PAD at approximately 7,700,000 barrels a day.

More Than 3,000,000 GI Home Loans

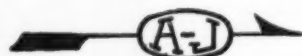
THE VETERANS Administration reports that 3,004,157 GI home loans, totaling \$19.6 billion, have been made to World War II and post-Korea veterans during the nine years the GI loan program has been in operation. Nearly 13 per cent of the 3,004,157 home loans, or 383,053, have been completely paid back. Only 16,218, or less than six-tenths of one per cent of the total, have resulted in claims paid by the government. VA said that the average size of all GI

NEW! Thin-Core Grilles For Doors—Partitions

1/4" to 3/4" Thick!



- CUTS INSTALLATION TIME 1/2!
- EASY TO INSTALL — NO DANGER OF RUINING DOOR!
- COMPLETE — NO WOOD MOLDINGS TO ADD!



First Grille ever designed specifically for thin doors and partitions. Anyone can install it in just a few minutes time. No close tolerances required . . . almost a half-inch extra on sides for positioning. Telescoping auxiliary frame fastens to grille with posts and screws. Clamps tight. No holes to position. Practically no danger of ruining door. No wood moldings. All steel. Rattle-proof. No vision, with 80% free area. Available with or without frame, all sizes. Gray or tan prime coated, or Hammertone finish in gray or bronze.

ACTUAL SIZE CROSS SECTION

Write For Our Complete

FREE CATALOG

Listing Over 1000 Types and Sizes of Grilles for Every Requirement

A-J MANUFACTURING CO.

Dept. A8
2119 Washington St., Kansas City, Mo.



the editor's notebook

(continued)

home loans made to date is \$7371.

More Than \$2 Billion for Scientific Research

GOVERNMENT EXPENDITURES for scientific research have topped \$2 billion. For the fiscal year of 1952, Congress granted "obligational authority" for the expenditure of \$2216 million, and the grant for 1953 is estimated at \$2427 million.

A Lot of Steel Used in Cooling Units

STEEL ACCOUNTS for about two thirds of the 200 lb of materials in one type of room air conditioner, and steel required in a 2 hp residential model utilizing the ductwork of an existing warm air heating system is estimated to amount to about 250 lb. This is in addition to the 500 lb of ductwork required for the heating system itself. Pointing out the significance of these figures, The American Iron and Steel Institute cites the more than 560,000 homes in this country with room air conditioning units and the more than 1,000,000 units sold for all purposes since the end of World War II.

Stainless Steel Production High

THE PRODUCTION of stainless steel ingots increased an average of 16 per cent a year from 1940 to 1951, according to the American Iron and Steel Institute. Stainless ingots are converted by the steel industry to nearly all the forms in which other steel is sold, such as bars, sheets, pipe, etc. Since 1935, when the official statistics on stainless steel were first compiled, the ingot output of this metal has increased more than 12 times, to a total of

The Right Register—

FOR EACH OF YOUR SMALL PIPE INSTALLATIONS

BY *Char-Gale*

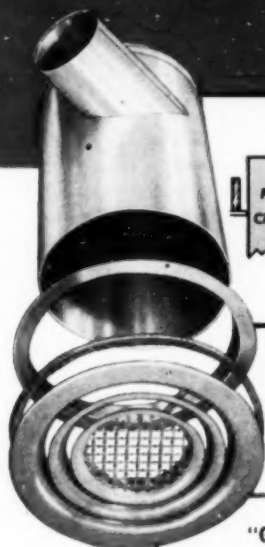


Diagram of typical Char-Gale "Gale-Aire" Ceiling Diffuser Installation.

A circular outward thrust imparted to the air entering the register box, produces a partial vacuum in the center of the cylinder. Room air is drawn up into the box and blended with the heated air to provide a gentle, effective warming action.

"GALE-AIRE" CEILING DIFFUSER

Newest Char-Gale register, the "Gale-Aire" Ceiling Diffuser is designed to provide effective air tempering and distribution. The unit includes a cylindrical box, fitting ring, foam rubber gasket, and register.



"GALE-AIRE" BASEBOARD REGISTER

Including all the features of the Sidewall Register, the "Gale-Aire" Angle Baseboard Register is designed especially for older homes. It is installed through a floor opening, with no wall cuts needed.



"GALE-AIRE" SIDEWALL REGISTER

The "Gale-Aire" Sidewall Register distributes air evenly in all directions along the wall. Adjustable, it permits complete balancing at the registers. Complete with register, box and a foam rubber gasket.



"GALE-AIRE" FLOOR DIFFUSER

Answers the need for an inexpensive method of distributing air along outside walls. Vanes set at proper angles to achieve a fan-shaped diffusion pattern.

Remember:

Char-Gale provides everything from plenum to register in the "Gale-Aire" System. Also a complete line of registers and fittings for your conventional installations.



Contact your jobber or write us direct

CHAR-GALE MANUFACTURING COMPANY

MINNEAPOLIS-MINNESOTA

the editor's notebook

(continued)

approximately 930,000 net tons in 1952, compared with the record high of nearly 934,000 tons in 1951.

FHA Starts 20th Year

ON JUNE 26 the Federal Housing Administration completed 19 years of service, during which time it has worked with nearly 17 million families in thousands of communities throughout the country. A recent bulletin from FHA points out that acceptance of the agency by the building industry and the general public can be ascribed to various factors: 1) Through its insurance programs, the hazards of investment in mortgages on residential properties have been greatly reduced; 2) It has been instrumental in effecting improvement in housing standards and in standards of community planning; 3) It is self-supporting.

FHA expenses are paid out of fees, premiums, and income on investments in government obligations. The earned surplus and statutory reserves of the agency on April 30, 1953 (not including the contribution of the Government) amounted to about \$305 million. These reserves include \$65 million available for distribution to mortgagors who complete payments on mortgages assigned to mutual mortgage group accounts with favorable loss experience.

Report on Housing Sales

ACCORDING to the United States Savings and Loan League's committee on trends in economics, the volume of house sales during the early months of 1953 has tended to be slightly lower than in the same period a

Sentry

TANK GAUGES

REMOTE READING
INDOORS • OUTSIDE
UNDERGROUND



ACCURATE, DEPENDABLE, WEATHERPROOF GAUGES
Easy to install... Easy to read!

Unaffected by specific gravity changes or variations, Sentry Remote Gauges accurately indicate liquid level at all times. Simplified mechanical operation eliminates unnecessary fittings, bulbs or levers for serviceman to tamper with as well as his need for access to building. Remote Gauge may also be combined with At-A-Glance Direct Gauge, shown below, for readings at both tank and remote location if desired. Non-corrosive, stainless steel and brass extension lines connect tank float with heavy-duty cast aluminum, weatherproof, thermometer type indicator — calibrated in fractions. Unconditionally guaranteed. Write for descriptive literature.

Type D-O and D-10 Gauge for basement tank installations with 2" and 1 1/2" openings respectively.

Type D-U Gauge for underground tank installations. Fits 2" openings only.



At-A-GLANCE

For accurate DIRECT tank readings

Fastest selling, most popular gauge in the industry. Simplified mechanism eliminates gears, cams, springs and magnets that wear out and cause trouble. Durable construction with patented assembly featuring unbreakable, fog-proof, heavy-duty double plastic domes with printed calibration scale between for clear, easy-to-see readability from any direction. Gauge is Underwriters' Listed and will withstand in excess of 70 lbs. air pressure per sq. inch. Entire unit is non-corrosive and guaranteed leakproof under pressure filling and against defective operation. Workman-ship and materials. Quick, simple to install even on partially filled tanks. Write for complete descriptive literature.

KRUEGER Sentry GAUGES

GREEN BAY • WISCONSIN

the editor's notebook

(continued)

year ago. Two-thirds of the savings association managers reporting indicate that higher priced houses are selling at a slower rate than last year; however, the rate of sales in the lower and medium priced fields is the same or slightly higher than a year ago.

Nearly three-fourths of the reports received by the committee indicate that there are more houses on the market awaiting sale now than there were last fall.

100 Billion Ton Coal Reserve in Colorado

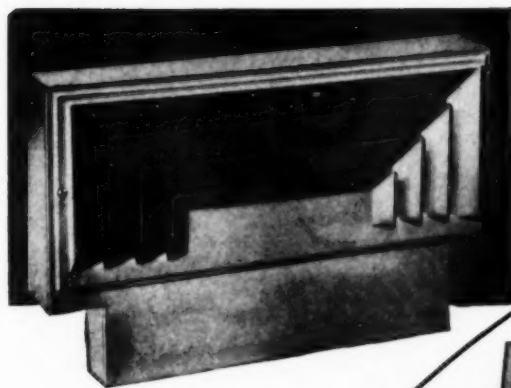
COAL RESERVES in Colorado totaling 100,408 million tons are described in a recent report of the Geological Survey, Department of the Interior. Of this total, 90,258 million tons, or 90 per cent, is bituminous; 9,437 million tons, or 9 per cent, is sub-bituminous; and 713 million tons, or 1 per cent, is semi-anthracite and anthracite.

Wants Sheet Metal Training Film

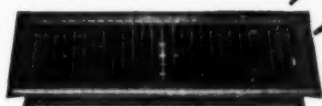
"WE HAVE a customer who is planning to put on a training class for sheet metal workers and he wants to rent a training film showing uses of different types of sheet metal workers' tools. We wonder if you have such a film. If so, please let us know, and also the cost of rental."

CONKLIN TIN PLATE & METAL CO.

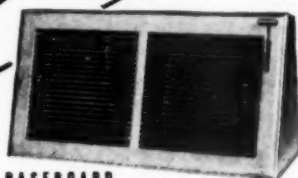
We suggest that you refer your customer who is interested in renting training films for sheet metal workers to Castle Films, Inc., 30 Rockefeller Plaza, New York 20. This company has a number of such educational films for sale and also maintains a renting service.



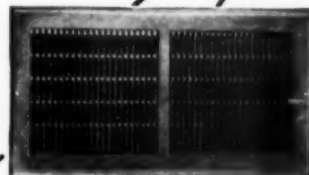
HORIZONTAL FIN SIDEWALL #20



PERIMETER FLOOR REGISTER #512



BASEBOARD PROJECTION REGISTER #243



VERTICAL FIN SIDEWALL #30

creating MIDCO demand for you

JOBBER'S:

Hundreds of outstanding MIDCO jobbers now serve dealers, contractors, architects, builders and buyers throughout the nation.

Additional jobber outlets are available in some areas. Send coupon at once for information and catalog.



MIDCO REGISTER CORPORATION
1059 GRAND AVE. • ST. PAUL 5, MINNESOTA

BEAUTY

You'll recognize how the beauty of MIDCO grilles and registers results from sound designing and skillful fabrication. They enhance the attractiveness of any room.

VARIETY

You'll find a style or design to meet any standard specification in MIDCO'S line of high and medium velocity, conventional forced air and gravity registers, grilles, floor faces and floor registers.

ADAPTABILITY

You'll appreciate the fact that MIDCO units are supplied in all commonly used sizes—for example, Nos. 30 and 34 multiple louvre registers come in 44 sizes, from 6x4" to 30x10".

ECONOMY

You'll agree that the pricing of MIDCO products compares favorably with similar lines. Further economies arise from the ease of installation and permanent durability of the MIDCO line.

**THESE FACTS CREATE MIDCO'S DEMAND...
PRODUCE GREATER PROFITS FOR YOU!**

Please send me full information on the MIDCO line and your proposition to jobbers.

NAME _____
STREET _____
CITY _____ ZONE _____ STATE _____



Dealer Harold Westrich, left, talking over Zone Control problem with Honeywell sales engineer Cal Duke.

"The way modern homes are laid out, one thermostat isn't enough"

says Harold Westrich, president, Adams Furnace Co., St. Louis

"And that means not only the more expensive houses, but a lot of the smaller homes, too.

"We work very closely here with a number of architects and quite often we're asked to analyze and then explain to their clients what the heating requirements of the home will be.

"So we have a lot of opportunity to tell people why they need Honeywell Zone Control.

"The reasons vary with every house, but more

often than not there's a problem of exposure or of the use of a lot of glass in a certain section of the house. Or maybe it's simply that the layout of a house requires that the sleeping area be controlled separately from the living area.

"Whatever the reasons, they add up to the fact that for many modern houses a single thermostat isn't enough. And that calls for one thing — Honeywell Zone Control."



*Another Plus-Profit
Idea from Honeywell*



"The simple logic of the Honeywell Zone Control story sold the Klingensmiths"

"After architect Paul Klingensmith and his wife had worked out the floor plan above for their combined home and office, I saw it was a natural for Zone Control.

"I told them so—and told them why.

"They'd divided the house into two distinct areas, by floors. The upstairs contained living quarters. The downstairs contained office and service areas.

"With a separate thermostat downstairs, they

could maintain any comfort level they wanted for daytime activities. Then in the evening the temperature could be lowered to save fuel.

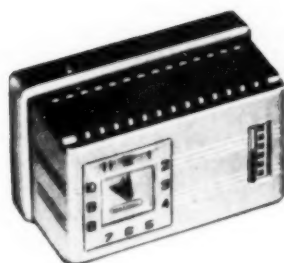
"With a separate thermostat upstairs they could maintain cooler temperatures during the parts of the day when the zone was unused.

"The simple logic of this convinced the Klingensmiths—and sold them on Honeywell Zone Control.

"And it added up to a nice extra profit for me."

Honeywell has controls for any zone job!

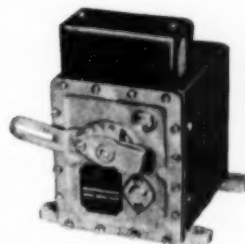
Here are three examples:



Electronic Chronotherm—famous, fully automatic clock thermostat. Provides night shut-down, automatic morning pick-up for 24-hour control.



Electronic Weathercaster—located outside the house. It senses changes in the weather, and signals the electronic system indoors, automatically.



Modutrol motor comes in several versions. It gives fast, accurate control of dampers and valve assemblies, gives years of trouble-free service.

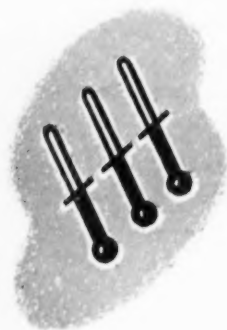
For complete information and application data on Honeywell Zone Control, call the Honeywell office nearest you. There are 104 of them located across the country. Or write Honeywell, Dept. AA-8-97, Minneapolis 8, Minn.

MINNEAPOLIS Honeywell



First in Controls

What IS THE LATEST



"Zoning" is the last word in modern heating all over the country. Today more and more people are demanding the kind of uniform comfort that may be had from a *Waterbury winter air conditioner*. Many Waterbury units will provide zoned heating without any changes; all can be adapted to it. Don't be left behind!

Give yourself a break

Since people everywhere are demanding zoned heating, sell it to them. Zone control is the new trend in home heating, and the Waterbury line of furnaces and winter air conditioners is ideal for zoned heating installations.

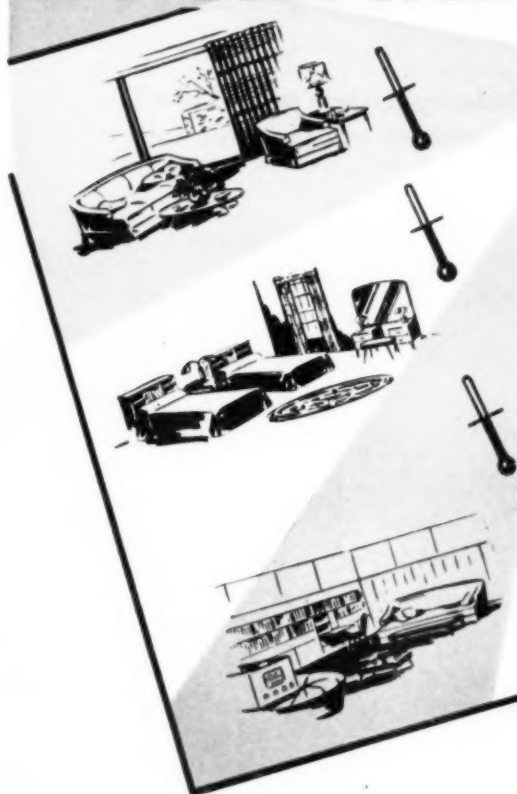
Zoned heating means uniform temperature—and, therefore, uniform comfort—throughout the home. Different temperatures in different parts of the home can also be achieved through zone control.

Many Waterbury units are constructed for zoned heating, and all can be adapted to it. Whether his home is large or small, your customer can enjoy the comfort of uniform temperature throughout the house with a Waterbury winter air conditioner.



Waterbury
furnaces
AND AIR CONDITIONERS

IN HEATING?



"It's what's under the casing that counts!"

Raise your sights to the Waterbury line:

THERE'S MONEY IN QUALITY

There is a Waterbury furnace or winter air conditioner for any size or type of home and for any kind of fuel. During a period of more than 46 years, the Waterbury line has become nationally known as quality heating equipment.

The Waterman-Waterbury Company maintains a comprehensive dealer-distributor-factory policy that will appeal to you. Write today for information on this clearly stated policy and the exclusive distribution rights granted by the company.



There is a Waterbury for every size home and every type of fuel—

The Waterman-Waterbury Co.

OVER 46 YEARS OF WARM AIR HEATING

1122 Jackson St. N. E. • Minneapolis 13, Minn.



"UNI-FLO" ENGINEERED Air Distribution

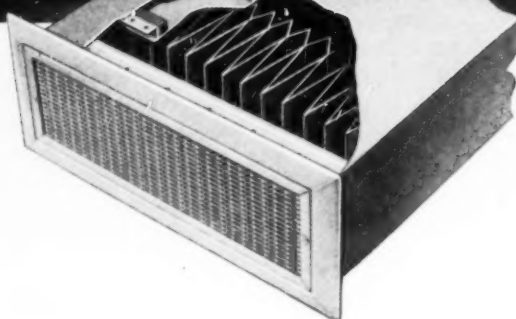
**New Uni-Flo High Velocity System proves itself—
is extended to second and third floor addition of Allstate Insurance Company**

Architects: Dunlap & Esgar, Consulting
Engineer: William Goodman, Ventilating
Contractor: The Haines Company, General
Contractor: Kaiser Durett Company,
all of Chicago.



Lobby of impressive Allstate Insurance Company building at Skokie, Illinois. Note Uni-Flo Sidewall Diffusers near ceiling which deliver low velocity air quietly for comfort of occupants.

Cutaway of patented Uni-Flo Air Valve in short take-off from main duct. Valve reduces high velocity air to normal flow with whisper-quiet results. Call on Barber-Colman for accumulated experience and a group of new engineering developments which solve high velocity problems.



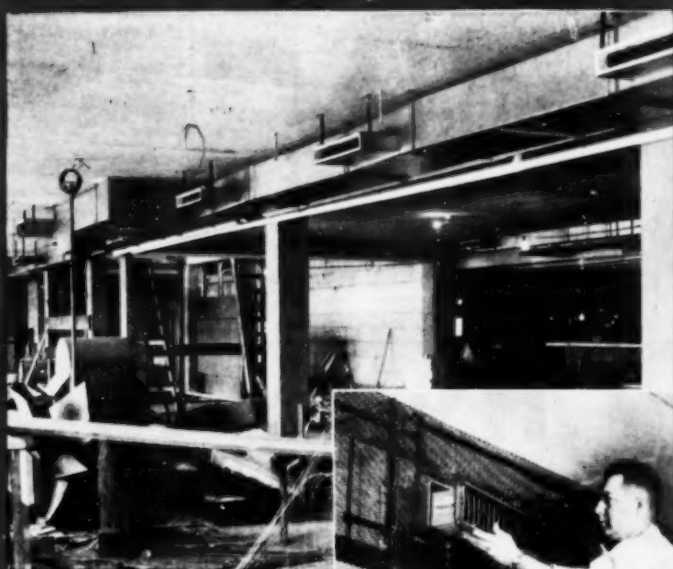
Nothing succeeds like success! Trial of Barber-Colman's new high velocity system in the first floor of Allstate Insurance Company's new building led to adoption of the same system for the second and third floor addition now being built.

Pressed for height in the original building, the architects and engineers turned to the high velocity system as a means of saving space. Small size ducts were installed and furred into place, lining up with the window soffit. Velocity of 3000 fpm at the fan . . . with 3" static pressure in the supply plenum . . . called for use of Barber-Colman's unique Uni-Flo Air Valves in back of each outlet. The

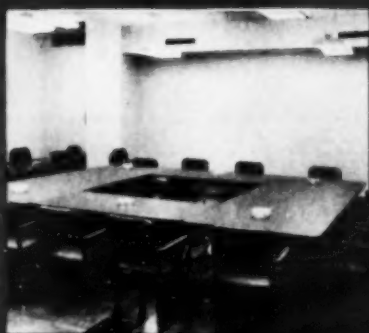
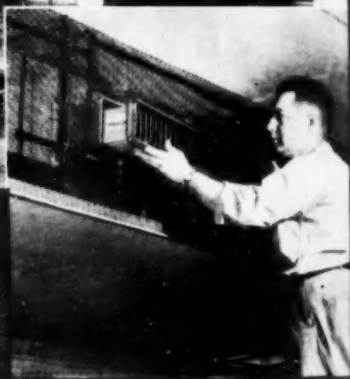
result — highly efficient air distribution at a remarkably low noise level — led to flat specifications of Barber-Colman equipment for the new addition.

One unique feature of the original installation was the use of Uni-Flo Air Valves to balance air quantities supplied to different zones. The contractor reports the innovation simplified balancing operations, thus saving on cost.

To be in the know on fast-growing high velocity systems . . . and their application to new or old buildings . . . call your nearby Barber-Colman field office for complete details. Or send coupon below for new booklet "High Velocity Air Distribution."



(Above) Ductwork before installation of partitions or metal lath ceilings. Complete job required 340 Air Valves, 12 High Velocity Control Units, 207 Sidewall Diffusers and Return Grilles, 10 Air-turns. (Right) Air Valve and Diffuser go into place. Valve is adjusted quickly and easily with key through face of Uni-Flo Double Deflection Sidewall Diffuser.



(Above) Meeting room is free from disturbing air noise, yet has ample, efficiently diffused air supply for participants in group discussions. (Below) In addressograph room, normal air flow is distributed effectively through attractive Uni-Flo Ceiling Diffusers (individually adjustable).



"UNI-FLO" ENGINEERED Air Distribution

Air Distribution Products • Automatic Controls • Industrial Instruments
Aircraft Controls • Small Motors • OVERdoors and Operators • Molded
Products • Metal Cutting Tools • Machine Tools • Textile Machinery

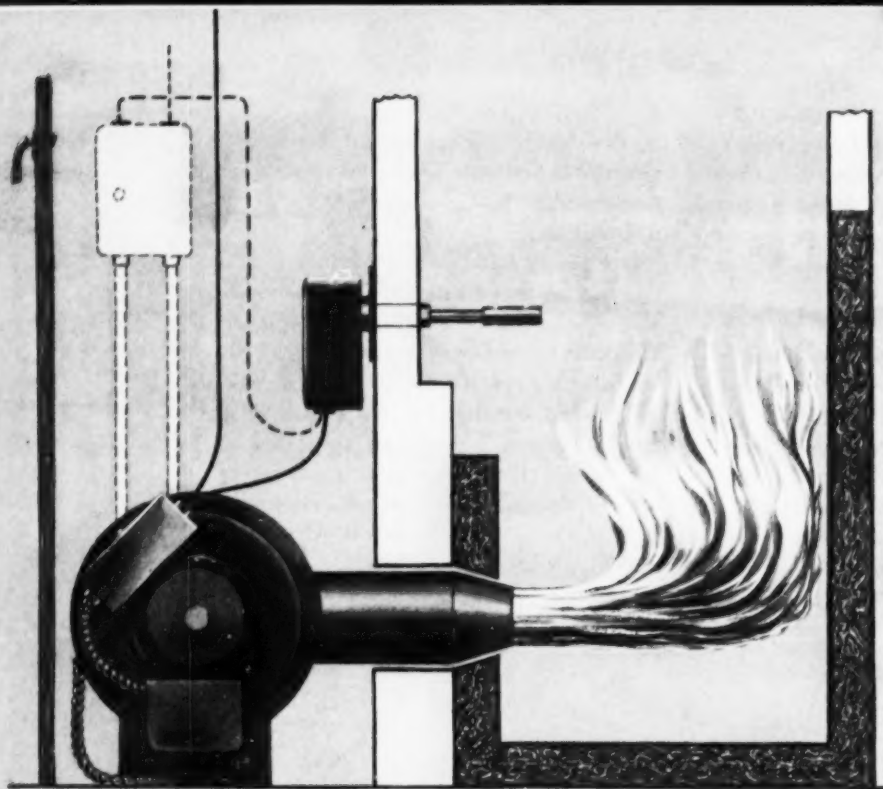
BARBER-COLMAN COMPANY, ROCKFORD, ILL., U. S. A.
Dept. H, 1106 Rock St. • Field offices in principal cities
☐ Send free booklet "High Velocity Air Distribution"
F-5772, with performance and descriptive data.

Name

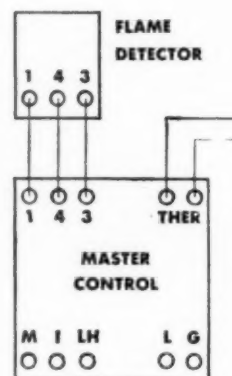
Firm Name

Address

City State



TYPICAL INSTALLATION shows mounting versatility of the G-E Master Control with separate Flame Detector installed in combustion chamber . . . both so easy to get at and service!



Wiring connections: left terminal (1) connects to cold, center (4) to moving contact, (3) to hot side.

EASY TO INSTALL!

New G-E Master Control with separate flame detector

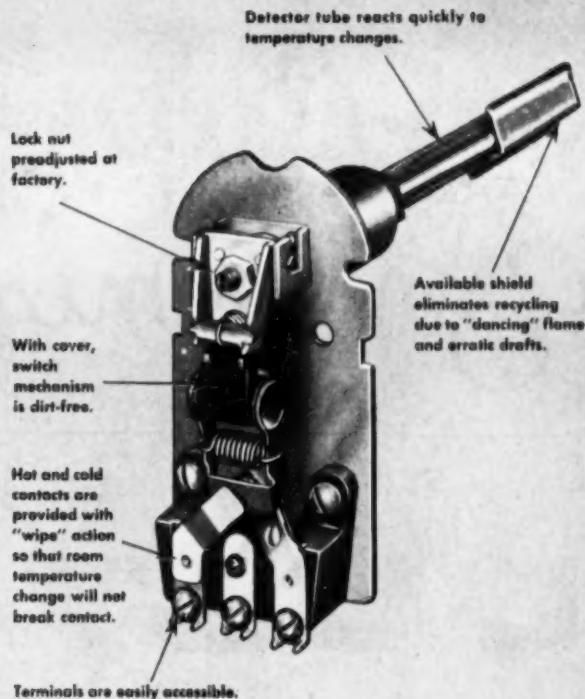
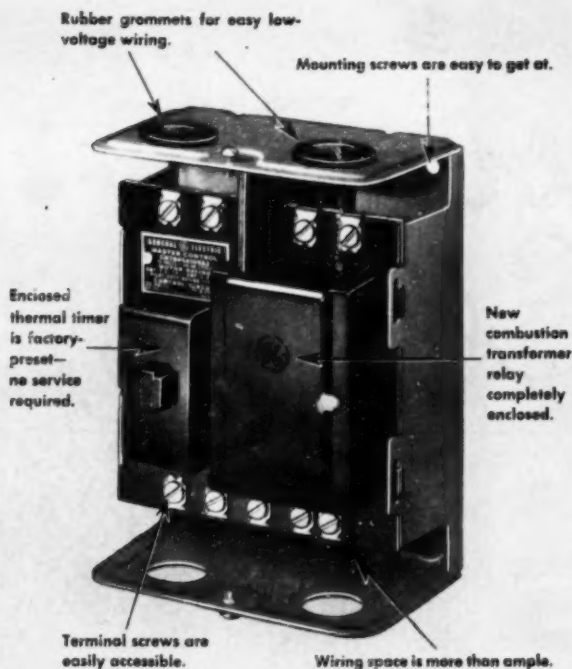
Here's a primary unit for oil burners that couples the advantages of fast action with simple, sturdy construction. Designed for use where instant-reacting control is desired, or where available stack is too small to use the Master Control-with-Helix, this new two-piece control has a speed of operation equalling that of any other type of flame detector. Wired in the same manner as the master-control-with-helix, except that three extra terminals are connected to the separate flame detector (see diagram above), the control can be mounted anywhere on the gun burner, side of the furnace or cabinet, making it easy for fast, complete service checks right at the furnace. The flame detector mounts anywhere temperature change takes place, including in

stack or combustion chamber, but away from heart of flame. Nichrome-quartz detector tube is so sensitive it instantly reacts to any 40 F change in either direction, and in case of flame failure shuts off the burner in 4 to 7 seconds.

The new G-E Master Control with separate flame detector mounts quickly, easily, in any position . . . no levelling, no field adjustments required. Flame detector has separate mounting flange and open terminals to further facilitate fast installation. For full information on this two-piece primary control, see your local G-E Apparatus Sales Office or write for Bulletins GED-1832 and 1837. Address Section 740-23, General Electric Company, Schenectady 5, N. Y.

You can put your confidence in—

GENERAL  ELECTRIC



MASTER CONTROL IS SMALL, COMPACT . . . light weight (less than 3 pounds). Positive timing . . . no nuisance lockouts.

FLAME DETECTOR NEVER NEEDS ADJUSTING, levelling; mounts in any position . . . It's a real snap to install and service.

EASY TO SERVICE!

shuts off burner on flame failure in 4 to 7 seconds

GE OIL BURNER CONTROLS

The Appliance Control Department of General Electric is devoted exclusively to developing and producing a complete line of controls for appliance and oil-heating manufacturers.

Fall promotion Starts mid-September

DUST-STOP and GODFREY

The best selling filter and the best salesman on the air—a combination that means faster turnover . . . greater profit for you. Especially if you tie in locally with the free helps shown below. Many dealers last season doubled sales by this method. Godfrey, on CBS, will reach *your customers*. Let them know you sell Fiberglas DUST-STOP Filters.

Get Promotion Folder and Order Card from
your DUST-STOP supplier now.
Also order an adequate supply
of DUST-STOP Filters.

store displays



customer reminders



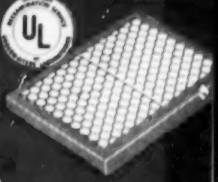


FOR EFFICIENT



FOR EFFICIENT OPERATION CHANGE REGULARLY

OWENS CORNING
FIBERGLAS



DUST STOP

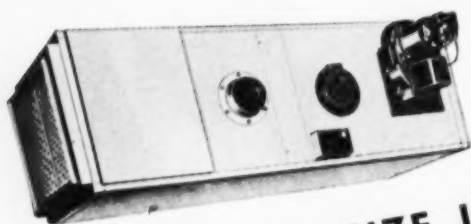
AIR FILTERS

Fiberglas (Reg. U. S. Pat. Off.) and DustStop are
trade-marks of Owens-Corning Fiberglas Corporation.

THE
Luxaire
OIL-FIRED
Horizontal Furnace
NOW AVAILABLE

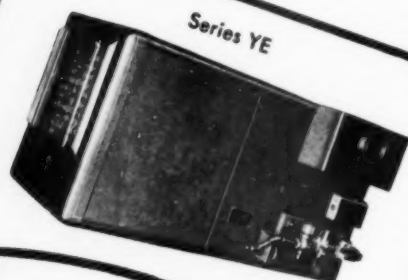
IN 2 SIZES
84,000 B.T.U. Output
**123,000 B.T.U. Output

SERIES OYE



** NEW LARGER SIZE JUST
ADDED to meet the demand
for higher capacities required
in some home and commercial
installations. A low-in-price . . .
high-in-quality Luxaire unit.

ALSO
Luxaire's
NEW
GAS-FIRED
Horizontal
Furnace



2 SIZES
with
65,000
B.T.U. Input
and 85,000
B.T.U. Input

See your Luxaire jobber before you make any commitments on Oil or
Gas-fired Horizontal Furnaces! Get the outstanding Luxaire features
. . . Get the attractive prices!

THE C. A. OLSEN MANUFACTURING COMPANY . . . ELYRIA, OHIO
Luxaire HEATING & AIR CONDITIONING UNITS

here's a
"Package of Profit"
 for you . . .
 from *Peerless Electric*



HERE'S PROOF: Thousands of dealer-contractors and many nationally known manufacturers of warm air furnaces specify Peerless Blower-Filter Package Units. Peerless units are **accepted!** They're easy to install, easy to handle and, from both performance and profit standpoints, **they're the best made anywhere!**

HERE'S WHY: Peerless Blower-Filter Package Units are safe, quiet, modern. They're compactly built with large filter access door and direct or belt drive Peerless Motors specially matched to the job. Peerless Blower-Filter Package Units are complete assemblies that can be installed even while the furnace is burning to give years of comfort and customer satisfaction.

Advantages

- Complete Assembly Ready-to-install
- Modern Rounded-edge Construction
- Shock Absorber Mountings for Vibrationless Operation
- Full Guarantees, Rapid Factory Service

WRITE TODAY: Peerless Electric offers you prompt delivery service through your favorite distributor. Write today for a complete list of prices and specifications.



Peerless **FURNACE BLOWER**

Cut installation time to a minimum, build profits up to a maximum by installing only Peerless Blowers . . . the sensational new unit that offers so many exclusive advantages to both dealers and jobbers.

"SMOOTHEST PERFORMANCE ON THE MARKET"

Peerless
Electric

FAN AND BLOWER DIVISION

THE PEERLESS ELECTRIC COMPANY

1405 WEST MARKET ST. . WARREN, OHIO

Another **Coleman** milestone, \$1,000.00 **COLEMAN**

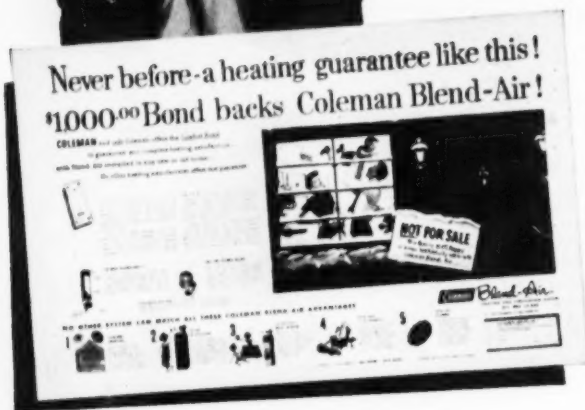
backs *Blend-Air*®-the



Now, the Comfort Bond that guarantees comfort—makes the “revolutionary Blend-Air heating system” the fastest selling package with the strongest-ever “buy-appeal”!

THIS COLEMAN BOND

Guarantees First Year's Comfort with Blend-Air!



BUYERS KNOW BLEND-AIR

Coleman national advertising keeps the public posted on America's revolutionary low-cost system . . . gets your homes quicker, better acceptance from the start.

You can sell homes faster with a Coleman Comfort Bond. It tells the buyer that added to the Coleman reputation for dependable service is the Coleman Bond, assuring him complete satisfaction of whole-house warmth with any Blend-Air installation that meets the specifications set forth in the Bond. Coleman makes this offer because nation-wide performance proves Blend-Air assures a better heated home. It makes your Blend-Air installation a big asset in selling homes.

With Bonded Blend-Air Comfort the home owner is sure his home will be kept heated and ventilated with freshly blended warm air that reaches every nook and cranny. No stratified, stagnant areas; no cold floors and hot ceilings. Uniform temperature—practically the same from floor to ceiling. Ideal “perimeter heating.” Blend-Air is the easy-to-install heating installation with a coast-to-coast list of satisfied users. Gives your prospects what they want in complete modern home comfort. Send the coupon now for complete information. The Coleman Company, Inc., Wichita, Kans.

NEW! BLEND-AIR CONDITIONING

for summer-winter comfort

Low-cost new air cooling unit that removes twice as much moisture from the air as conventional systems. Gives crisp mountain cooling; not damp, clammy cold. Operates with same blender action to give fresh-over room circulation.

Uses same plant, distribution and air blending systems—attach cooling unit any time. The system that *improves* air conditioning. Install heating equipment now—add cooling later, often as little as \$6.70 a month under FHA terms.

another big sales first!

COMFORT BOND

heating system that sells homes faster



BONDED COLEMAN COMFORT WITH LOW-COST BLEND-AIR INSTALLATIONS

1 A MAGIC BLENDER in every room blends room air with freshly heated furnace air right in the wall, then REcirculates it for constant, even warmth. Controls individual room temperature.

2 3 1/2-INCH AIR TUBES carry freshly heated air from furnace to blenders. Easy to install — prefabricated — with adjustable

sections to bend around obstacles. A real advantage — saves time, makes every job easier.

3 BLEND-AIR SAVES SPACE — furnace uses as little as 6 sq. ft. Install in basement, closet or utility room. Fresh-air intake insures continuous supply of freshly heated, filtered air through individual air tubes. Simplified return-air system.

Comfort costs so little with a

AMERICA'S
LEADER
IN HOME
HEATING

Coleman®

ALL EQUIPMENT 80A APPROVED OR LISTED WITH UNDERWRITERS' LABORATORIES

THE COLEMAN COMPANY, INC.
Dept. 751-AA, Wichita 1, Kansas

Please send full information on Bonded Heating Comfort with Coleman Blend-Air.

☐ Oil ☐ Gas ☐ LP Gas

Name _____

Address _____

City _____ State _____

"IF IT ISN'T COLEMAN — IT ISN'T BLEND-AIR"

Now... a low-cost motor for all kinds of damper applications

Here are the motors you need to make installations easier and to increase profits on damper applications! These Honeywell models give you more flexibility of usage. This enables you to sell more damper motors because you have a model to meet all kinds of job applications.

Dealers find quality features plus the Honeywell name make these motors easy to sell! For example, the smooth, quiet hydraulic operation and "fail-safe" cut-off features are sure to please customers.

For full information mail coupon on opposite page or call your local Honeywell office.



Plug-in Model M828A

This plug-in type motor is ideal for hand-fired installations. Easy to install. Can be used with any of four Honeywell thermostats.

\$19.80



Transformer Model M828C

For use with a separate transformer. Can be used with any of the four different Honeywell thermostats, shown on opposite page.

(price includes transformer) **\$24.80**



*Another Plus-Profit
Product from Honeywell*

Increase your profits by selling Honeywell Heat Regulator Packages

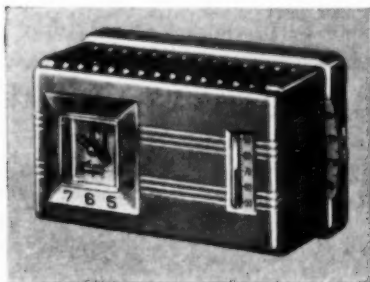
Everyone wants automatic heat control—and here's a complete package to help you cash in on this natural demand! It consists of a Honeywell damper motor and one of the famous Honeywell thermostats, plus necessary installation accessories (see table below).

Honeywell Heat Regulators sell better, because most people are familiar with Honeywell's famous reputation for quality—and thus your

prospects are more receptive from the start.

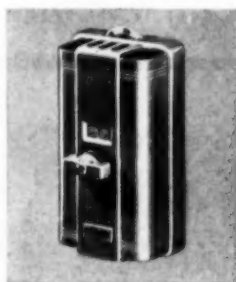
Promotion of this package often leads to many new customers—in addition to developing sales among your regular customers. And of course, these are *extra sales*—and *extra profits*. So why not make your plans now to take advantage of this fine profit opportunity.

Phone your local Honeywell office or mail coupon below for all the details.



Electric Clock Thermostat

Gives completely automatic control; turns heat down at night—up in the morning.



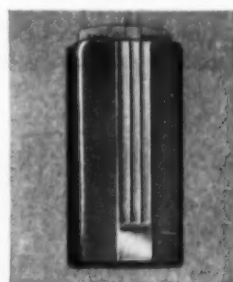
Time-O-Stat

Automatically turns heat to desired setting in morning.



Comfort Thermostat

Highly sensitive to provide even control and comfort.



T824 Thermostat

Gives accurate damper control at economical price.

Honeywell Heat Regulator Packages

Y228A Clock Thermostat, M828A Motor, accessories \$59.30	Y231A Time-O-Stat, M828A Motor, accessories \$42.30	Y229A Comfort Thermostat, M828A Motor, accessories \$33.60	Y219A Thermostat, M828A Motor, accessories \$27.00
Y228B Clock Thermostat, M828C Motor, accessories \$64.30	Y231B Time-O-Stat, M828C Motor, accessories \$47.30	Y229C Comfort Thermostat, M828C Motor, accessories \$37.60	Y219C Thermostat, M828C Motor, accessories \$32.00

MINNEAPOLIS
Honeywell



First in Controls

MINNEAPOLIS-HONEYWELL REGULATOR CO.
Department AA8-195, Minneapolis 8, Minnesota.

Gentlemen:

☐ Please send me complete information and consumer sales aids on Honeywell Heat Regulator Packages.

☐ Please send me information on Honeywell Damper Motors.

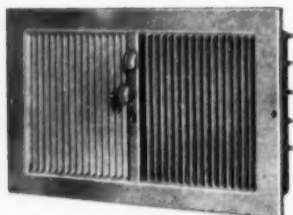
Name

Firm Name

Address

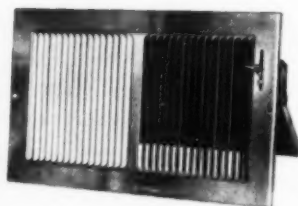
City Zone State

AIR CONTROL REGISTERS



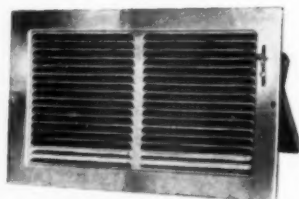
No. 10 SERIES

For sidewall and baseboard air conditioning installations. Four styles combining adjustable vertical and horizontal fins provide complete control and lowest resistance. Satin beige finish can also be painted to match walls.



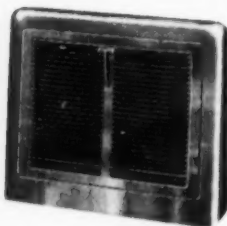
No. 110 SERIES

For performance and economy, a single damper register with vertical fins. Equipped with Air Control Adjusto-Stop to serve as a balancing damper. Satin beige or Metalescent finish.



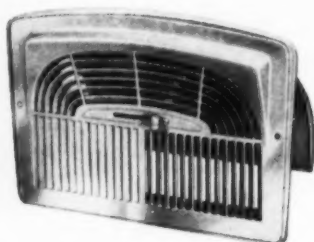
No. 210 SERIES

A companion to the No. 110 Series with horizontal fins. Has the Air Control Adjusto-Stop balancing damper to let you balance the whole system from the register face. Satin beige or Metalescent finish.



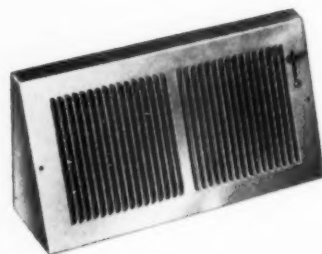
No. 50 SERIES

A gravity register with simple, modern lines. Equipped with Air Control balanced damper . . . adjusts to any position and always stays in place. There are no friction parts to wear out . . . no screws to adjust.



No. 15 SIDEWALL PERIMETER DIFFUSER

The one superior perimeter diffuser giving coverage up to 14' x 8' that blankets an entire wall . . . without turbulence. Requires fewer openings and priced lower to save you money on every installation.



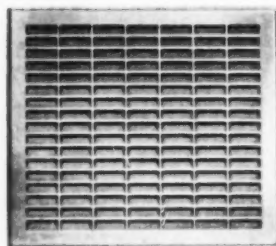
No. 165 SERIES

Perimeter baseboard registers ideal for out-of-the wall installations with block or poured concrete where cutting is impractical. Truly economical. Adjusto-Stop damper to cut costs and allow easy balancing.

ANNOUNCING

**2 NEW
UNITS
2 NEW
VALUES**

Two units with the same high quality . . . the same high efficiency that has made Air Control the preferred standard.



No. 333 SERIES RETURN AIR GRILLE

The rugged, good looking answer to installations calling for one central return. Located in ceilings, walls or doors, the No. 333 is available in a complete range of sizes to provide the right capacity for every system.

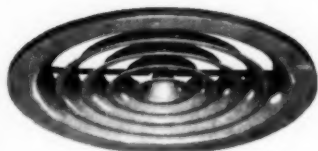


No. 334 SERIES RETURN AIR GRILLE

Right for a thousand tough locations. Designed to fit in toe-cave of standard cabinets for a trim, finished look. Or use it in window seats, on stair risers . . . any place you need return air capacity in the smallest possible space. Remember! Air Control's No. 334 is made to do it best.

& DIFFUSERS

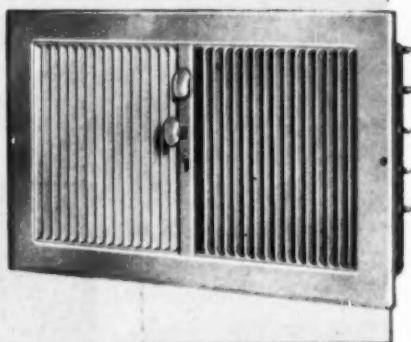
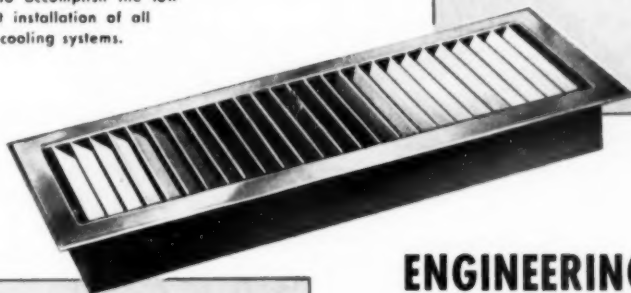
*for summer cooling
for winter heating*



CEILING DIFFUSERS

Flush Mounted or Step Down models for smooth good looks and utmost efficiency. Air flow rings present minimum resistance and rapid air diffusion. Dampers, installation rings and drop rings also available.

PLUS Ventilators, Return Air Grilles and all of the specialized heating accessories you'll need to accomplish the low cost, efficient installation of all heating and cooling systems.



ENGINEERING LEADERSHIP PUTS AIR CONTROL OUT IN FRONT

Here, in one complete line, is all of the balanced design it takes to make your heating or cooling system work at peak efficiency. Each unit in the Air Control line combines the lowest resistance factor with the greatest spread and throw to make air do its job best, cover wider areas and eliminate the annoyance of drafts.

Air Control registers and diffusers are designed for economy, too! The new Air Control plant embraces every advance in modern manufacturing technique to produce quality products at consistently lower prices.

Be sure of a better finished installation. Be sure of quality and low cost. Standardize on Air Control for every job.

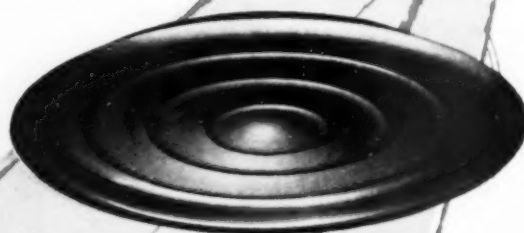
SEE YOUR LOCAL JOBBER OR WRITE FOR THE AIR CONTROL CATALOG TODAY

AIR CONTROL PRODUCTS, INC.
Dept. A
COOPERSVILLE, MICHIGAN

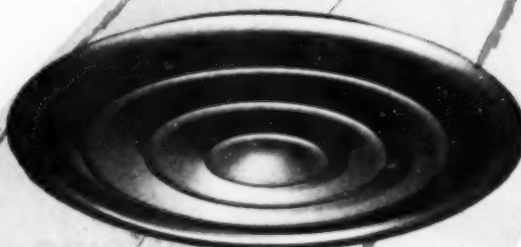
Like in a pod...

... all diffuser types in the new Aerofuse Type 'P' Series are identical in appearance with beautifully styled matching facial contours and the same number of rings. This outstanding feature insures uniformity when more than one type—or more than one size—is installed in a conditioned area.

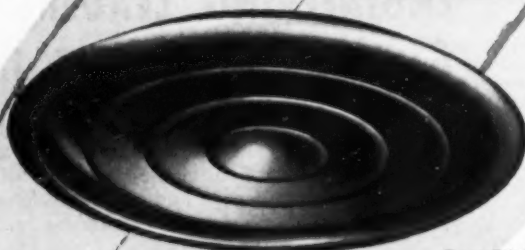
Engineered to meet the most rigid specifications of efficient, satisfactory performance, each diffuser type in the new Aerofuse line is designed for a specific air delivery job. For an installation that is right, both in appearance and performance, specify Aerofuse at the vital point of air delivery.



Type PA
Adjustable Pattern Diffuser



Type PS
Stepped-Down, Fixed Pattern Diffuser



Type PF
Flush, Fixed Pattern Diffuser



Type PR
Flush, Supply and Return Diffuser

Write for copy of Catalog No. 105... complete information, selection charts, engineering data.



TUTTLE & BAILEY inc
NEW BRITAIN, CONNECTICUT

NWAHACA Retains Technical Coordinator

THE BOARD OF TRUSTEES of the National Warm Air Heating and Air Conditioning Association, at the association's recent semi-annual board and committee meeting in Chicago, approved the retaining of Lorin G. Miller as technical coordinator of the association. Mr. Miller, formerly dean of engineering at Michigan State College, accepted the association's offer effective July 1, when he retired from the faculty of the college. As technical coordinator, he will continue to serve as chairman of the association's educational advisory board and to coordinate the activities of the committees responsible for the preparation and revisions of the association's published manuals and educational work. He will also analyze the test results from the association's field investigation program and prepare the annual reports of these investigations for publication.

At the meeting, plans were discussed by the indoor comfort conference committee and the college short course committee for 1954 conferences and short courses. Twenty indoor comfort conferences are planned for the 1954 season.

Proposed changes to the Federal Housing Administration's minimum property requirements on central warm air heating were discussed by the committees, and a special committee was appointed to present the association's recommendations to FHA.

Speakers at the luncheon on June 12 included W. D. Redrup, president of the association, and C. W. Nessel, chairman of the field investigation committee. R. W. Roose, who is leaving the warm air heating research staff of the University of Illinois to join the editorial staff of *Heating, Piping & Air Conditioning*, was presented with movie equipment in recognition of his co-operative work with the association's research program.

New Agency to Help Business

SECRETARY OF COMMERCE Sinclair Weeks, speaking at the recent annual convention of the National Sales Executives, Inc., in Atlantic City, said that the Department of Commerce had completed preparations to set up a new business services agency. It is designed to help business earn more money, employ more workers, and through a knowledge of better methods, sell more goods at cheaper prices.

"We propose to establish approximately 20 main industry divisions", he said, "with key advisors recommended by various industries to represent them, and staffed for operation purposes by industrial experts."

Major divisions are planned for iron and steel, electronics, consumer durables, etc. Various other industries will have their own special sub-divisions. The chairman of each commodity division will be a well-known industrialist recommended by his industry. Members of the advisory committees also will be leaders in their fields, Secretary Weeks said.

Functions of the proposed business services agency will be to:

1. Continue production directives.
2. Service the respective industries with specific information.
3. Act as the authoritative voice of industry so that the Executive Branch and the Congress may hear the opinions of business and receive helpful information from business on legislative and administrative matters.
4. See to it that private business is placed in a position where it can effectively approve or disapprove of the implementation of government policy and plans from the standpoint of their practical workability in everyday industrial operation.

Secretary Weeks explained, "We plan to help advertisers, sales executives and salesmen through industry divisions dealing with marketing and distribution problems of individual industries; the coordinated services of our office of distribution; the new business census activities; a new study of the movement of inventories; and other projects or continuation of programs."

New Motor Standards Announced

NEW STANDARDS allowing more horsepower to a frame size for all of the popular high production alternating current type electric motors from 1 to 30 hp were announced last month by C. O. Hedges, chairman of the motor and generator section of the National Electrical Manufacturers Association, 155 E. 44th St., New York 17.

He cited the advent of superior synthetic insulating materials, new and better silicon steels and improved techniques — as well as real advances in the art of motor design — as developments which permit packing more horsepower into electric motors for a given size and space.

"The new motors," Mr. Hedges declared, "will continue to satisfy fully the same performance standards of torque, temperature rise and starting current limitation as before. These standards, while using a fewer number of frame sizes to cover this range of horsepower, retains the previous frame numbering system."

"Complete data on derivatives, types of mountings, etc., are now available as a result of the section's approval of its committee work. Frame assignments have been made to cover the 2- through 12-pole speed ratings for the open

WHAT'S HAPPENING —

(Continued from preceding page)

and totally enclosed, fan cooled types.

"As in the past, the standards have been laid out to afford maximum interchangeability between the totally enclosed, fan cooled ratings and the open type ratings by utilizing the same horsepower-frame relationship as far as possible," he said.

"In this re-rating program," he continued, "for a while there will be some users of electric motors who will have to stock additional renewal parts and, perhaps, additional spare motors during the transition period. But, more horsepower for a given size, lower space and storage costs, more economical mounting platforms, and easier installation and maintenance are advantages of the change-over which will shortly outweigh all other considerations.

"For the electric motor manufacturers," he said, "the new standards, for the first time in 25 years, offer an opportunity to make full use of new techniques and technological advances. However, the new program, for them, involves a substantial amount of engineering, development, testing and re-training of factory personnel, as well as changes in production facilities and techniques. Therefore, it is estimated that the first of the new motors should become generally available early in 1954. Naturally, each company will determine and announce when its motors, built to the new standards, will be ready."

Air Conditioning Unit Shipments Double

ACCORDING to figures compiled by the Bureau of the Census, self-contained air conditioning units shipped in 1952 totaled 424,105 as compared to 232,438 shipped in 1951. Year 'round units (self-contained, except heat pumps) shipped in 1952 totaled 10,173, compared to 7728 for 1951. Of the 1952 total of year 'round units, 4077 had self-contained furnaces and 6396 did not. Shipments of refrigeration type mechanical dehumidifiers number 72,017 in 1952. This compares with 75,659 shipped in 1951.

Steel Production Hits Monthly High

THE GREATEST monthly steel production in history, totaling 10,163,000 net tons of ingots and steel for castings, was achieved during the month of March. This was the first time that the 10-million ton mark had been reached in steel production. With the record high output during March, the production for the first quarter — 28,999,000 tons — was higher than ever before in any quarter. The April output, totaling 9,545,000 net tons, was 1,553,000 tons higher than the output for the same month in 1952.

March also set a record for shipments of finished steel products. Shipments during that month totaled 7,436,919 net tons. Shipments during the first three months of this year set a quarterly record of 21,057,464 tons, a total which was 1.2 million tons higher than in the first quarter of 1952. Among the products showing substantial increases over the shipments of the first

quarter of 1952 were rails, electrolytic tin plate, sheets, hot rolled and cold finished bars, mechanical tubing and semi-finished forms of steel.

Gas Heat Authorized for 25,000 Homes

APPROXIMATELY 25,000 Illinois home owners were recently authorized to install gas furnaces under the terms of the Illinois Commerce Commission's gas restriction order. The new authorizations cover all individuals who had applied on or before March 20, 1952, for existing homes and on or before April 30, 1952, for new homes. Applicants since March 20, 1952, for existing homes, and since April 30, 1952, for new homes — approximately 65,000 — will remain on the gas heat waiting list under the terms of the commission's restriction order.

The restriction order, in effect since July, 1946, will be continued until further supplies of gas become available. This is dependent upon completion of the underground storage project now under construction near Herscher, Ill. This project is being engineered by the pipeline companies which bring natural gas from Texas to the northern Illinois area. Gas will be stored during the summer months for withdrawal during the winter months when house heating demands are at a peak.

Publish New California Heating Guide

VOLUME II of *The Southern California Warm Air Heating and Ventilating Guide*, just published, includes latest heating and ventilating codes and license and permit data on every jurisdiction (incorporated cities and county building departments) in the 10 southern counties of California. Also included are FHA minimum requirements for heating and ventilating; California State Housing Act requirements for heating and ventilating; a directory of principal trade associations, government agencies and bureaus allied to the industry; data on California state heating contractors' licenses; and a compendium of all educational courses offered for the industry in the area. Copies may be ordered from Building News, 5616 San Vicente Blvd., Los Angeles 19. The price is \$1.50, plus 15 cents for handling.

Open Hot Strip Mill in Pennsylvania

A 66 IN. SEMI-CONTINUOUS hot strip mill has begun operation at the Allenport, Pa., works of the Pittsburgh Steel Co. The new mill, using four finishing stands, has a rated top speed of 1770 ft per minute, and is expected to produce 600,000 tons of strip and sheet steel annually.

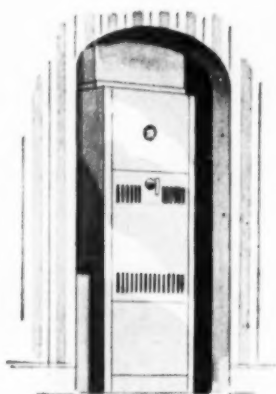
Migration to Suburbs

A RECENT SURVEY of several cities and their suburbs (reported in an Anthracite Institute bulletin) shows that the rate of growth of dwellings in the outlying areas has been three times as rapid as in the cities themselves. Of all units constructed between 1944 and 1950, 68 per cent have been in the suburbs. The great majority of the new suburban homes are being equipped with modern automatic heating systems in preference to gravity type systems.

SU-30-G
85,000 BTU
input per hour



SU-35-G
110,000 BTU
input per hour



AGA Approved!
**for alcove and
closet installation**



Gas-fired **RICHMOND** winter air conditioner

Where space is tight, use the Richmond SU-G, gas-fired, vertical winter air conditioner... ideal for the small ranch-type installation.

Now the SU-G is approved by the AGA for alcove and closet installation. When ordered for this type of installation our standard unit is especially adapted to meet the rigid AGA requirements. When ordering the Richmond SU-G for closet or alcove use, be sure to state that fact.

Remember that the SU-G can be furnished with a bottom filter rack as optional equipment at no extra charge. And remember these special features: Remote pilot igniter (standard equipment) for convenience and safety in lighting burner from outside of furnace... burner and controls quickly and easily removable as mounting plate is held securely in place with four nuts. When space and economy count... count on the Richmond SU-G.



RICHMOND

RICHMOND RADIATOR CO.—AFFILIATE OF REYNOLDS METALS CO.

See your wholesaler or Mail Coupon Today

Richmond Radiator Company AA-8
Box 111, Metuchen, New Jersey
Please send me full information on Richmond SU-G
gas-fired winter air conditioners.

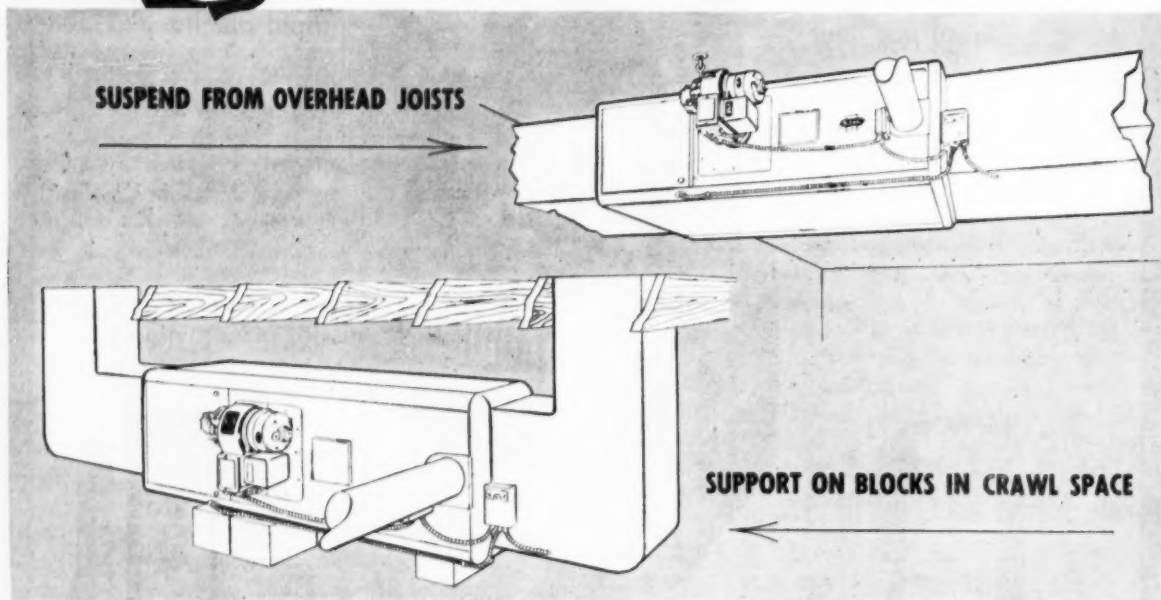
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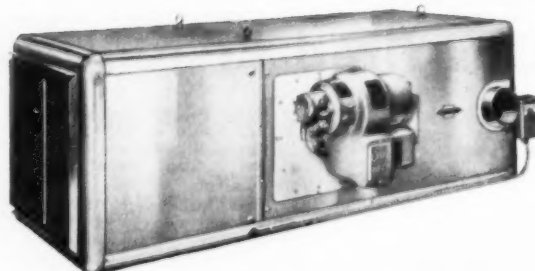


*There's real money to be made
with this new space-saver, oil-fired,
forced warm air furnace!*



New DELCO-HEAT horizontal furnace offers big sales opportunity

Now Delco-Heat Dealers can set their sights on a brand new money-making market. Here's the answer to where to put the heating plant . . . as homes get more and more compact and basements, garages, and extra rooms are cut out of plans. This new horizontal unit is engineered for installation in crawl space or from overhead joists. It's designed for perfect comfort with Delco-built coordinated controls, high-pressure oil burner and stainless steel Quik-Action Heat Transmitter. Shipped assembled for easy installation. Capacity 75,000 btu/hour output. Only 72 $\frac{1}{2}$ " long by 25" square. It's another example of how General Motors and Delco-Heat team up to give you the most valuable franchise in the industry. For information about new territories available, write Delco Appliance Division, General Motors Corp., Dept. AA, Rochester 1, N. Y. In Canada, Delco-Heat, Toronto 13, Ontario.



Delco offers a complete line of automatic oil- and gas-fired conversion burners, Conditionair forced warm air furnaces, boilers and electric water systems.

For a good deal—

DEAL WITH DELCO



General Motors Engineering
Delco Production Skill



...your keys to Sales Success

Pick your
package

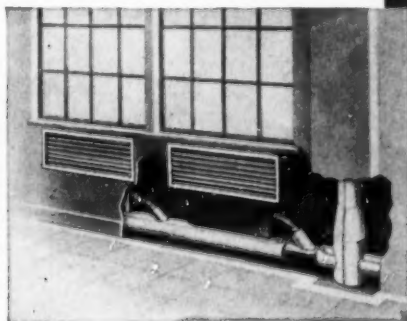
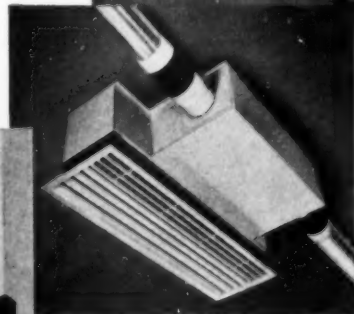
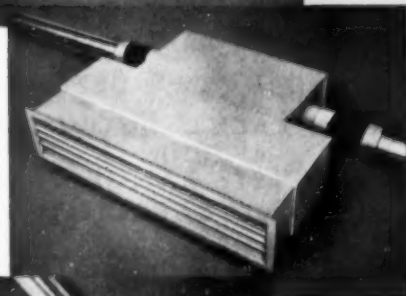
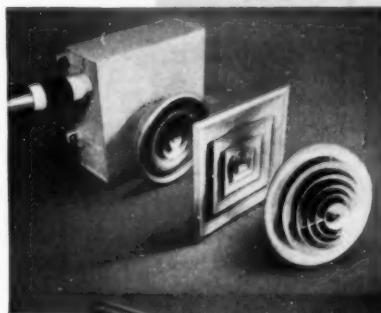
ANEMOSTAT HIGH VELOCITY ASPIRATING UNITS

Here's Anemostat's answer to the problem of high velocity air distribution.

Each of these easy-to-install packaged units consists of a combination static pressure and velocity reducing valve, plus sound attenuating chamber and one of several types of Anemostat draftless air diffusers. A wide choice to meet all your engineering and architectural requirements.

For top flight performance in high velocity air distribution systems, pick your package from Anemostat's line of tried and proven high velocity units.

Write for High Velocity Manual No. 48 for details.



ANEMOSTAT®

DRAFTLESS Aspirating AIR DIFFUSERS

ANEMOSTAT CORPORATION OF AMERICA

10 EAST 39th STREET, NEW YORK 16, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

"No Air Conditioning System Is Better Than Its Air Distribution"

Niagara No. 710-B
Shear recently in-
stalled at the Bison
Blower Co., Buffalo,
New York.



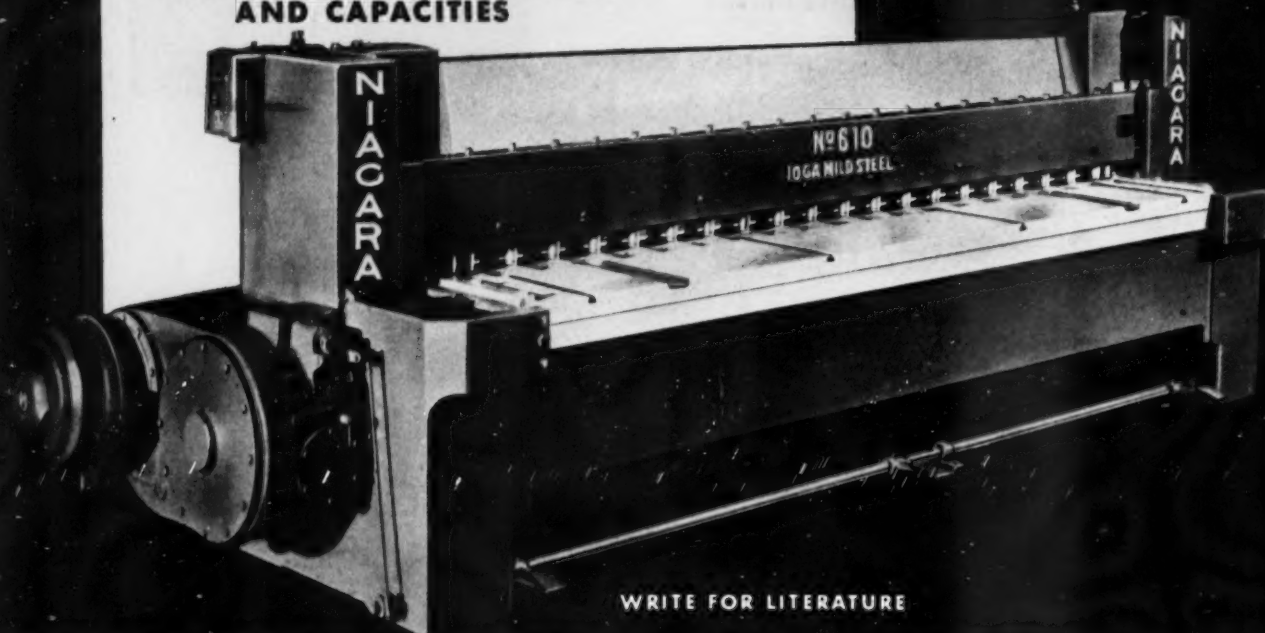
**Another Industrial Sheet Metal Shop
adopts...**

NIAGARA POWER SQUARING SHEARS

Use power in YOUR shop to help meet competitive bidding.
Bring in jobs you haven't been able to handle
and thus increase your profits.

Niagara offers the ultimate in:

- SPEED
- DEPENDABILITY
- ACCURACY
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- COMPLETE RANGE OF SIZES
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NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK • PHILADELPHIA

Dealers in principal U. S. cities and major foreign countries



Says Lowell A. McCord
Friendly Viking Representative

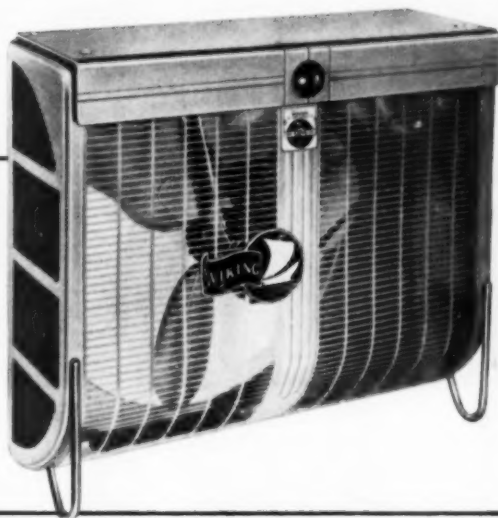
"One to stock—two to sell".....
That's what my Illinois Distributors
and Dealers like most about our
Viking '944' Window Fan
FOR 1953"



"That '944' Fan and Automatic
Timer Combination of Viking
really makes the inventory dollar
go a long way!"

W. L. TOMLINSON, The Field & Shorb Co.,
705 North Pine Street, Decatur, Illinois

"My dealers like the '944' because of its general suitability for the average 4 or 5, and even 6-room house or apartment, its terrific salability due to streamlined styling, and that Automatic Timer feature that gives them an extra step-up sale to shoot at, without another fan to stock."



BE SURE TO WRITE FOR THE UNIQUE VIKING SALES PLAN

UNIQUE VIKING VAD-NIT—Redeemable for \$3 towards liberal local co-op advertising. You get one Vadnit for each fan you buy.



VIKING WINDOW FAN DISPLAY—A demonstrator that really sells fans. Hundreds were sold for \$8.00 but you can get one FREE for only 3 Vadnits.

FAN PROMOTION KIT—Contains all the sales tools needed to pile up record profits from fan sales.

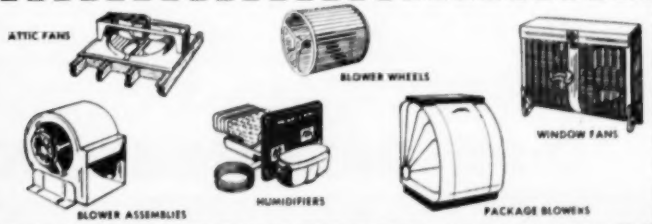


Here's What Illinois Dealers say about the Viking '944' FAN-TIMER Combination



"I'm sold solid on their '944' Fan because the terrific styling job makes it a favorite with my prospects. And when I tell them how those big air-scoop 22" blades can really move big volumes of air (actually 3100 ft. per minute), the fan practically walks off the shelves."
WM. T. SCHWENK, Westervelt Paper Co.,
730 E. Cerra Gordo, Decatur, Illinois

"It's no trick to keep my customers happy, and yet stock only one kind of fan, if that fan is a Viking '944'. If they want a two-speed fan the '944' is right up their alley. And if they want automatic control, I just add an Automatic Timer and everybody's happy. They get better service, and I make bigger sales, without tying up money in extra inventory."





For tight
neat bends...

difficult shapes
and angles...



use U·S·S GALVANIZED STEEL SHEETS

● To facilitate handling of your more complicated jobs . . . to meet the requirements of exacting clients . . . always use U·S·S Galvanized Steel Sheets on all types of ductwork installations, from small pipe residential heating units to large air conditioning systems for plants and offices.

U·S·S Galvanized Steel Sheets are fabricated from high-quality carbon steel, with a uniformly heavy coating of zinc that won't flake or crack, assuring lasting protection from rust and corrosion. Because all U·S·S Steel Sheets are uniform in flatness, ductility and workability, they can be bent, cut, stamped, welded or

soldered quickly and easily.

Your customers know and appreciate the quality that stands behind the U·S·S Label appearing on U·S·S Galvanized Steel Sheets. It will pay you—in satisfied customers and repeat orders—to cash in on the wide acceptance of this well-known product.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S GALVANIZED STEEL SHEETS

UNITED STATES STEEL



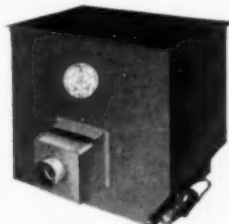


Makes All 4

Offer your customers heating units that bear the JZ trademark. It identifies home heating units that are easy to sell, make workman-like installation and guarantee customer satisfaction.

CENTRAL HEATERS

John Zink Central Gas Heaters are available in Vertical or Horizontal Forced air models. Suitable for installation in attic, closet, basement, utility room, under the floor, or as a suspended heater. Attractively finished.



FLOOR FURNACES

John Zink Gas Fired floor furnaces are available in 5 conventional and short models with input ratings from 30,000 b.t.u./hr. to 85,000 b.t.u./hr. When equipped with safety pilot and automatic temperature control they are a complete heating plant in a package.



UNIT HEATER

The John Zink UHS Gas-fired fan type suspended heater is a complete, packaged unit and fully automatic. A. G. A. approved for natural, mixed, manufactured or LP Gas.



WALL HEATERS

John Zink's new WH-25 Recessed Wall Heater fits standard 2" x 4" stud partitions on 16" stud centers, is barely 58" high. Attractive modern design and finish. Available in standard and radiant styles.



John Zink now offers a new, highly efficient BLUE FLAME CONVERSION BURNER, for converting solid fuel furnaces to gas.

John Zink Burners are protected by more than 50 U. S. Letters of Patent.

It's easy to supply your customers from the John Zink line.

JOHN ZINK COMPANY

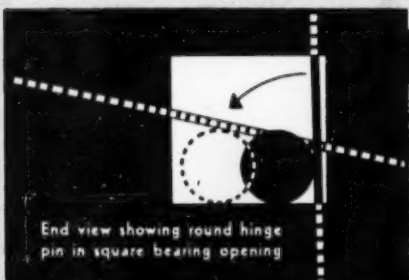
4401 South Peoria

Tulsa 18, Oklahoma

**for every $\frac{1}{100}$ " of excess draft permitted
by a draft control there is
a 1% waste of fuel ***

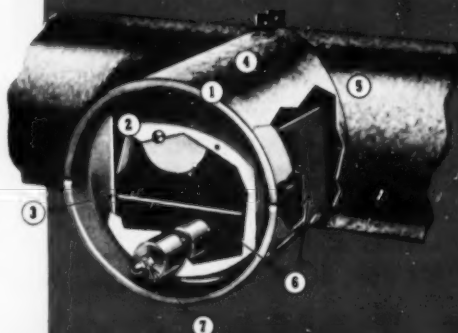
Fuel economy is *mighty* important! Yet an inaccurate control will commonly permit up to $\frac{5}{100}$ " of excess draft — fuel wastes up to 5%! That's why dealers know there is no substitute for Field accuracy. A Field Control permits a hair-line instrument setting that eliminates excess draft, yet allows for the minimum draft needed. That's because Field's gate, balanced on a Duo-Static balancer, rolling on a friction free axis, is sensitive to as little as $\frac{2}{1000}$ " of draft change. Wise dealers know that Field accuracy pays off in fuel savings, in reduced service calls, in customer satisfaction. Its performance has been proved by a score of years and 10,000,000 installations.

FIELD'S ROLLING HINGE PIN: This patented gate mounting — a "rocking chair" action — is more friction-free than even the finest ball or roller bearing assembly. And because there is no sliding friction this pin can be much heavier and more rigid. It is this friction-free mounting that provides Field's unmatched sensitivity.



... that's why there is no substitute for Field quality

- 1 — **Made of heavy materials** — Field controls last longer.
- 2 — **Balanced at factory** — Eliminating weight variations which could affect control's accuracy.
- 3 — **Rocker type hinge pin** — Quickly responsive, no friction. No sticking.
- 4 — **Long Collar** — No warping or clogging due to heat or soot, no service calls.
- 5 — **Free smoke passage** — A Field Control never blocks the flue.
- 6 — **Side wings and fitted gate** — More accurate because opening in control increases more uniformly.
- 7 — **Factory adjusted** — Set to maintain .06" draft until instrument setting is made.



field
DRAFT CONTROLS

*Fuel waste without any draft control runs up to 30%; with an inaccurate control 5% fuel waste is common.

FIELD CONTROL DIVISION of H. B. Conway & Co. — **Hamlet, N.C.**

AFFILIATES: CONCO BUILDING PRODUCTS, INC. — Brick, Tile, Stone
CONCO MATERIALS HANDLING DIVISION — Cement, Blocks



Arnold Kruckman's Washington Letter

Will New Agency Grant More Small Business Loans?

WITH THE PRESIDENT'S APPROVAL and Senator Capehart's vigorous support, the Congressional Conferees came to an agreement about the differences in the Small Business Administration bills passed by the Senate and the House.

The new Agency will have lending authority of \$275 million; it can make loans up to \$150,000 each to small companies which cannot obtain private credit. And it is provided with a Lending Policy Committee headed by its Administrator, and with Secretary of Treasury Humphrey and Secretary of Commerce Weeks as members.

The Small Defense Plants Administration was voted out of existence by Congress, its end occurring on July 31. But on the next day, August 1, it was programmed by the White House and by the Congress to continue, without interruption of its previous functions, as the Small Business Administration, with the same personnel on its staff in Washington and elsewhere, and with the same Administrator, William D. Mitchell, who assumed the office in mid-June.

Many small business groups will be glad to learn that the SDPA will continue as the SBA. During the last two years the SDPA has very effectively served smaller business as its liaison with the defense agencies distributing and placing contracts. Its staff had become the firm reliance of thousands of business men in guiding them through the intricacies of Government negotiations. The SDPA was largely responsible for the loans which RFC gave to smaller business people — whether to implement defense contracts or for other urgent needs. These loans ran from a few thousand to sums as high as a half million dollars.

The Conferees also recommended that the lending powers of RFC be voided 60 days after SBA comes into existence, and that the RFC should continue liquidation until June 30, 1954, when it lapses by law. Thereafter, RFC programs, such as operation of tin and synthetic rubber plants, will be transferred to such other Agencies as the President designates.

RFC Administrator Kenton R. Cravens, who came from the job of executive vice president of the Mercantile

Trust Company of St. Louis, a banking credit specialist during all his business career, has been surprisingly frank in making clear that he thinks small business firms, unable to obtain fiscal credit for defense or other undertakings, should not be eligible for loans from Government. He has stated categorically that he holds the greater good of the whole economy is served best when marginal operators, those who have difficulty in maintaining their businesses, are shaken out or are absorbed by larger firms with more resources. He recently told a Massachusetts business applicant for a loan that he was supported in this view by the RFC Loan Policy Board consisting of Secretary of Treasury Humphrey, Commerce Secretary Weeks, and a member of the Federal Reserve Board.

Humphrey and Weeks are designated as members of the SBA Loan Policy Committee. William D. Mitchell, nominated and confirmed as SDPA Administrator last June, as chairman becomes the third member of the SBA Loan Policy Committee. Incidentally, many small business elements favored the Senate's Loan Policy Committee idea rather than the provision in the House Act, which would have given the Committee, (which in the House Act was headed by the Secretary of Treasury), the control over all administrative policy as well as the lending policy of SBA.

Responsible authorities, close to the powers-that-be in Washington, declare that the Administration takes a dim view of any operation in the Federal Government akin to a banking function, which requires Treasury funds to make loans. It is expected Mr. Mitchell, who came from a brief career in small business after a long career in Government service including a responsible position in RFC, will conform to Administration policies.

The Senate Small Business Committee made a point of emphasizing that since early in May there have been no loans to smaller business for any purpose by RFC. The House Small Business Committee, early in May, issued a statement showing that during March, 262 individual contracts, totaling \$25,900,000 in value, were awarded to small firms under the joint determination



Washington Letter

program operated by the Defense Department and the SDPA. Up to March, 766 contracts valued at \$108,800,000 had been awarded to small firms during the period while the joint determination program was in operation. Of these contracts small business in New York State received a total of \$20,000,000 in value; New Jersey, \$15,000,000; Illinois, \$12,000,000; Massachusetts, \$11,700,000, and California, \$10,500,000. On a cumulative basis, the leading States, by value of loans granted small firms by RFC on recommendation of SDPA, were: Illinois, \$5,000,000; California, \$4,000,000; Pennsylvania, \$3,500,000; Texas, \$3,200,000, and Ohio, \$3,000,000.

At the end of May, the House Small Business Committee, headed by William S. Hill of Colorado, made this statement in its weekly staff report: "A preliminary study of the recently issued loan policy statement by RFC Administrator Cravens indicates that more stringent criteria will be followed in granting loans in the future. The policy statement includes new requirements for essentiality which may serve as a basis for the denial of many small loan applications which would have been favorably considered heretofore. In addition, a defense loan application will now be rejected if other contractors which do not need RFC assistance are available. Since few small firms can qualify under strict tests of 'essentiality', a rigid interpretation of the new loan criteria will result in a considerable reduction of loans to small concerns. The new policy also calls for the reduction in maximum loan maturities from 10 years to five years, and will force greater bank participation. This policy will serve to reduce the number of loans made to small firms, because of their need for longer-term credit. The committee is studying the actual effect of these new policies on small business applicants who have been unable to find necessary financing from private financial institutions."

In early June the Senate Small Business Committee, in its weekly staff report, stated: "The RFC made three loans in the week ending June 4, only one of which was to a business firm. This record low lending rate, coupled with the announcement that loans to business have averaged only three a week since Administrator Cravens placed into operation RFC's drastically restricted lending policies, confirmed the widely held belief that qualified small business concerns can no longer look upon that agency as a source of needed credit. The decline of RFC as an aid to small business can best be illustrated by

contrast with its activity a year ago. During the week of May 29-June 4, 1952, RFC reported 64 loans and four increases totaling \$10,340,239.60."

Also early in June, the House Small Business Committee reported: "A committee survey of the effect of the new RFC loan policy indicates that since its announcement, nine small business loan applications favorably recommended by SDPA have been disapproved by RFC. These applications were for loans totaling \$895,400. One application recommended, for a loan of \$250,000, was approved by RFC under section 4 (a) of the RFC Act. Note that this loan involved a 60 per cent bank participation. Since the announcement of the new policy no loans have been approved under the Defense Production Act which grants SDPA authority to recommend loans to the Government lending agency."

On July 3 the House Small Business Committee, in its weekly staff report, commented that if the RFC were allowed to expire, small business would be hard pressed to receive adequate long-term financial assistance. It reported that its staff was assembling detailed data regarding organizations now supplying long-term loans to small firms. That report also contained information received by the committee that the Department of Defense "will carry out revisions in defense contracts during the next six to eight months to reduce procurement levels in accordance with existing requirement estimates." The report stated, "In many cases, extension of delivery schedules will be the general procedure in bringing about reductions, rather than outright contract cancellations. Any such program changes will have a considerable effect on the many small subcontractors furnishing components in the major military hard goods program."

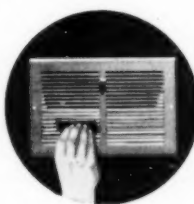
Aim at Reducing Government Overhead

Defense Secretary Wilson thinks defense production and defense contracts should be placed in charge of fewer plants, that every interest of the defense emergency and the Government economy, would be best served by doing business with fewer firms and concentrating activities among those who are able to finance their production without recourse to any Government agency. The philosophy, shared by Secretaries Weeks and Humphrey, apparently was reflected in the policy of RFC, since these men constituted, with a member of the Federal Reserve Board, the loan policy committee of RFC.

There are, of course, many earnest people who have



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14" x 5"
14" x 6"
14" x 8"
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24" x 6"
24" x 8"
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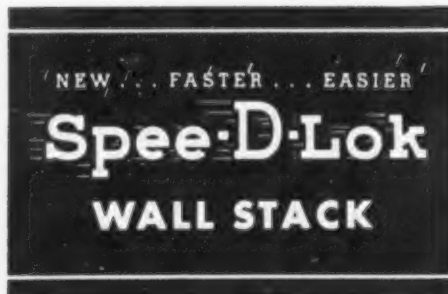
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WASHINGTON LETTER —

recently come into the Federal Government who believe the practice of this philosophy will help materially in reducing the overhead of Government. They think the agencies which insure housing loans, provide funds for the farmers, and the many other agencies which supply insurance guarantees for banks, for individuals and for various types of business, should be gradually eliminated. They feel this will cut down payrolls, and overhead, and will turn over to private business many operations that will be obliged to pay taxes and swell the receipts of the Treasury.

Feel Agency Is Needed

The National Association of Independent Business, Inc., of New York, in its mid-June *Washington Memorandum* discussed the troubles of small business in getting loans, commenting upon statements that had been made by the spokesmen for the American Bankers Association before House and Senate Committees. These spokesmen urged there was no need for any Government agency to provide loans to small business because the banks are able to take care of all small business credit needs. The NAIB asserts it found, after investigation, "(1) Smaller manufacturing firms get relatively less credit from banks, insurance companies and public bond flotations than do the larger manufacturing firms. Smaller firms have to rely, to a great extent, on financing by suppliers, personal loans, and financing of accounts receivable and warehouse stocks. The lack of adequate credit resources is a cause — not the result, as asserted by the banks — of the greater instability of many small business firms. (2) Larger manufacturing firms get the giant share of the long-term loans. In other words, the larger firms get the largest share of the type of credit that contributes to further safety. The smaller firms get a disproportionately minor share of the loans needed to make them more efficient, more profitable and more secure."

The bulletin continued, "Another major area of discrimination against smaller firms is the cost of borrowing. Studies have clearly demonstrated that the cost of borrowing by smaller firms is far in excess of the cost for larger firms. The latest comprehensive study in interest rates goes back to the end of 1946. At that time, the Federal Reserve Boards show that firms with assets of \$5,000,000 and over paid an average of 1.9 per cent on bank loans, while the firms that had assets of under \$50,000 paid an average of 5.2 per cent interest — 174 per cent more. This significant difference in costs is prevalent throughout, so that you can conclude as a general rule: the larger the firm the less it costs to borrow funds, the smaller the firm the more it costs to borrow.

"The average interest rates charged by member banks of the Federal Reserve System at the close of 1946 were: 5.2 per cent for borrowers with assets under \$50,000; 4.2 per cent, with assets of \$50,000 to \$250,000; 3.5



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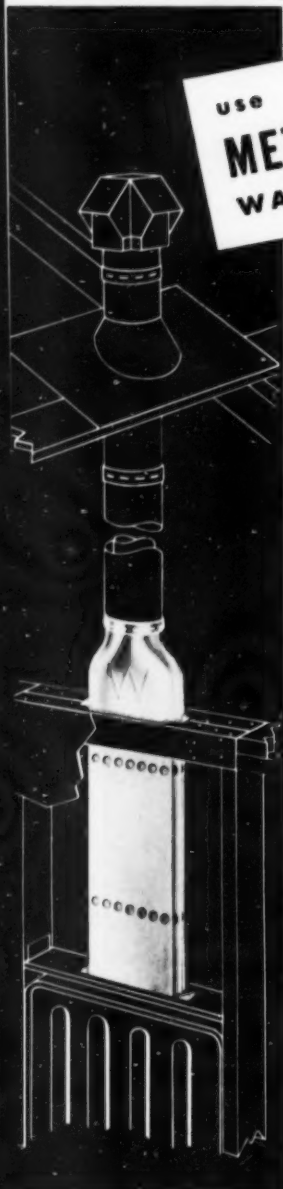
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WASHINGTON LETTER —

per cent, with assets of \$250,000 to \$750,000; 2.8 per cent, with assets of \$750,000 to \$5,000,000; and 1.9 per cent, with assets of \$5,000,000 and over.

"In all fairness, it should be recognized that there is a logical reason for some difference in interest rates between small and large concerns. The cost of investigating and servicing a small loan may be the same as for a large loan. If so, then the percentage of the cost to the amount of the loan will be higher for the smaller loan than for the larger one. However, overhead of banking costs can explain only a minor part of the difference in interest rates. Generally, bankers attribute the large differences to variations in risks; loans to small business, they say, entail far greater risks than loans to large firms. Contrariwise, as stated in a study of small business by the Committee for Economic Development, 'the ordinary contact between banker and borrower, especially in large urban centers, falls far short of giving a clear insight into the needs and possibilities of the small business seeking financial support.' If the smaller firm has fewer avenues for getting loans, it must more readily accept the higher interest rates. Whatever the reason, the fact remains that the spread in the cost of borrowing acts as a discriminatory factor against the smaller firm in favor of the larger firm.

"It is probable that a proposal like Senator Sparkman's on Government-sponsored insurance of private bank loans to small business may, if adopted, tend to narrow the differential and borrowing costs."

The association, in discussing the latest RFC policy, stressed that it would result in discrimination against smaller firms. The *Memogram* concludes with these words: "The new RFC policy offers additional proof of why Congress should establish a truly independent agency which is empowered to act as a watchdog of small business interests and with power to initiate and administer small business policy matters."

Will New SBA Reverse the Trend?

What the new SBA can do for small business will, of course, be influenced by the size of the loans which it can grant. The conference agreement placed the limit at \$150,000. However, SDPA-sponsored loans in the past have gone as high as \$500,000.

The conference agreement gives the SBA a \$275 million revolving fund, \$150 million of which could be used to make small business loans. Another \$100 million is for bidding on prime government contracts which can then be sublet by SBA to small businesses.

Zoned House Heating Gains Favor

ZONING for residential heating is becoming increasingly popular, according to Harold W. Sweatt, president, Minneapolis-Honeywell Regulator Co. He said the practice of dividing a house into two or more separately controlled heating areas had gained greatly in public favor in 1952 and it was expected that the trend would continue.



Thatcher

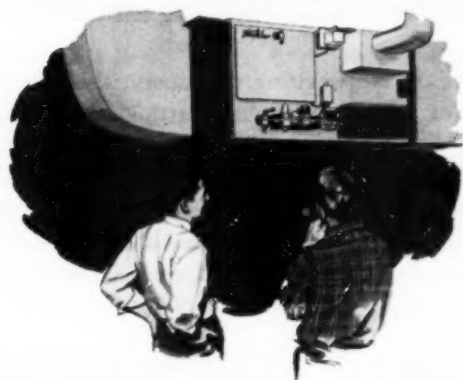
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GAS-FIRED
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*year in . . . year out . . . more and more
appliance manufacturers
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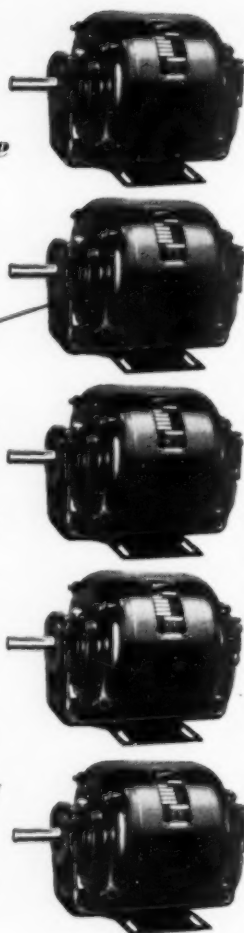
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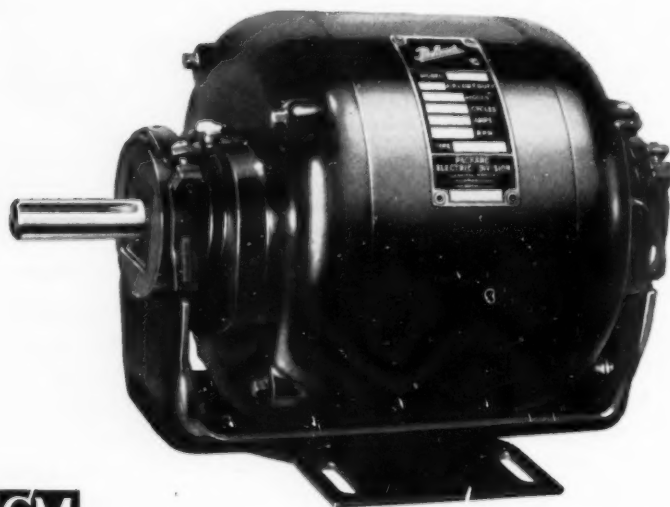
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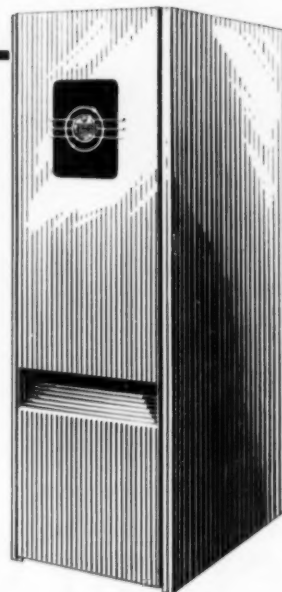
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When the furnaces you sell are protected by Bonderite, you have a feature that can be demonstrated quickly and easily to prospects. Bonderite protects and preserves paint finishes in 3 important ways:

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Ryerson galvanized sheets have a uniform coating that gives long-lasting protection against corrosion. And it's a coating that doesn't chip or peel when you work the metal! This means that your jobs stand up, give your customers the satisfaction they want.

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We unreservedly guarantee every machine—every tool we sell to be as represented and of first class material and workmanship. This means you can be sure of complete satisfaction no matter what metal-working equipment you need. Every type is available through your nearby Ryerson plant. And we are specialists in machinery and tools for sheet metal fabrication.

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Now's the Time to Check Heating Systems

LAST SPRING, when the heating season ended, many people forgot all about their warm air heating plants. Now is a good time to mail a postal card reminder to let your customers know that the heating system is like all other mechanical equipment — it needs attention.

The card could be mailed to all customers who either had service rendered or bought new equipment during the past year. It could be pointed out that a checkup now — with all parts at room temperature — would permit the service man to examine the furnace more thoroughly than at any time after the heating system has been put into regular use.

It would be well to remind the customer that often small cracks in the casing occur due to the expansion and contraction that take place during every heating cycle, and that an examination now may reveal these minute defects that could cause a complete failure of the heating system (if the defect becomes more serious) during the cold months when heat is essential.

Some warm air heating dealers list all the services that they will perform and quote a price that makes the inspection well worth the money. One heating dealer has learned to limit the number of these cards he sends out each week. He can estimate (from past experience) the proportion of orders he will receive, and does not want to promise more work than he can promptly handle. This dealer lists all the services he performs regardless of how minor they seem because, as he says, the person interested in his heating plant is also interested in what needs attention. He offers the following services: to replace the filters, oil fan and burner motor, check blower belt drive, replace nozzles, check nozzle pressure or gas burner input, inspect the combustion chamber, examine fuel supply piping for leaks, check draft regulator setting, determine stack temperature and adjust the burner for its best efficiency, check fan and limit switch, check stack control, clean humidifier, adjust humidifier control valve and clean the thermostat contacts.

Your customer can be told that during the coldest months, the furnace must work near its rated capacity, and that records show more malfunctions when equipment performs under maximum demand conditions. Thus, there are more service calls during the coldest months, requiring service personnel to work overtime. This not only increases the cost of a service call but invariably extends the period of time between the call and the service man's reaching the address.

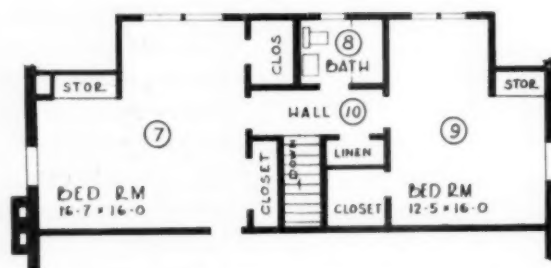
A fall checkup not only helps to reduce the winter demands upon the service department but gives the warm air heating dealer the opportunity to sell additional accessories such as humidifiers, filters and belts, and to tell the customer about the benefits of continuous air circulation.



1 THE METHOD presented in the new NWAHACA Manual 11 was used to cool this home . . .



2 THE LOAD FOR each room being calculated separately on both the first floor . . .



3 AND THE SECOND floor, using the tables and worksheets in the manual as a guide

New Way to Figure Cooling

How procedure outlined in
NWAHACA's new Manual 11 is applied to a typical job

F. W. Deady

Bryant Heater Div.
Affiliated Gas Equipment, Inc.

A RECENT PUBLICATION of the National Warm Air Heating and Air Conditioning Association — tentative Manual 11, *Design And Installation of Summer Air Conditioning for New and Existing Residences* — is the first of its kind offered on an industry-wide basis. The method for heat gain calculation outlined in the manual is particularly adapted to residences having total cooling loads not in excess of 5 tons. As such, it differs in several basic ways from past methods intended primarily for calculating commercial or small industrial cooling loads.

One difference is the greater emphasis which the new method places upon heat gains through the walls, windows and roof of the structure, less attention being paid to the occupancy and equipment loads characteristic of commercial or industrial applications. As is to be expected, the new method follows closely the

procedure already familiar to those contractors who have in the past been concerned primarily with heating installations — that is, it deals with appropriate factors by means of which the heat flow through any given surface area of the building in question can be accurately estimated.

The following discussion is aimed at providing a detailed, step-by-step application of this new method to the cooling load calculation for a typical residence.

Select Design Temperature

The residence selected as a model (Fig. 1) is constructed of light colored brick veneer side walls having sheet rock and plaster interior finish with 3½ in. loose rock wool fill evenly distributed throughout all outside wall stud spaces. It has a full basement and one and one-half stories of living space, with the knee-walls and ceiling of the upper story also insulated with 3½ in. of loose rock wool fill. As a means of reducing the overall heat gain load, the owner already has installed awnings on the east, west and north win-

dows. The house itself faces south, but because of the exceptional view upon which it fronts, the owner is unwilling to shade or otherwise block the view from the large windows located in the living room and den across the south wall. This home is located in the general Cleveland area.

Referring to Table 1 of Manual 11 (Fig. 5), we note that for the Cleveland area, design dry and wet bulb temperatures are given as 95 F and 75 F, respectively. As is outlined on page 10, paragraph 4-11 of Manual 11, the usual practice is to design on the basis of an indoor temperature of 80 F, since this is the temperature which should not be exceeded under extreme outdoor conditions. Since these design, or extreme, outdoor conditions are attained or exceeded only for a very minor part of the cooling season, the somewhat more desirable comfort level of 75 F may thus be easily attained for the major part of the cooling season without resorting to exceptional operating costs. We, therefore, select 80 F as the indoor design tempera-

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ADDRESS: 1379 Westwood Drive
By CONTRACTOR: N. & W. Heating & Air Conditioning
ADDRESS: Cleveland 10, Ohio
DESIGN TEMPERATURE DIFFERENCE: 15° F

Abbreviations Used in Worksheet:
CD - Compass Direction
RF - Running Feet
SF - Shade Factor
GRC - Glass Heat Gain Constant
COR - Type of Construction
W - Windows
WTR - Wall Transmission Coefficient
HTH - British Thermal Units Per Hour
HGF - Heat Gain Factor
P - People
CFM - Cubic Feet Per Minute
REG LOC - Register Location
WLN - Wall
BTU - British Thermal Units Per Hour

ROOM USE	ENTIRE BLDG.	Living Room	Dining Room	Kitchen	1st Fl. Hall	Master B-R	Den	1st Fl. Hall	B-R	2nd Fl. Hall	2nd B-R	2nd Fl. Hall	2nd B-R	2nd Fl. Hall	2nd B-R	2nd Fl. Hall	2nd B-R	2nd Fl. Hall	2nd B-R
1 ROOM NO. & STORY		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2 ROOM NO. & STORY		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3 EXPOSED WALL AND COMPASS DIRECTION		CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF	CD RF
4 CEILING HEIGHT		8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'	8'
5 GROSS EXPOSED WALL AREA		CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA	CD AREA
6 WINDOWS AND DOORS		CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU	CD CON SF GRC AREA BTU
7 NET EXPOSED WALL AREA		CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU
8 PARTITIONS		CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU
9 CEILING		CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU
10 OCCUPANCY (200 = No. of People)		CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU
11 HEAT GAIN PER ROOM		CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU	CD CON SF HGF AREA BTU
12 TOTAL HEAT GAIN		25,193	3,779	7,588	36,530	3 Tons													
13 VENTILATION FACTOR (0.15 = E123)																			
14 HUMIDIFICATION (0.30 = E123)																			
15 TOTAL COOLING LOAD (W12, 13, 14)																			
16 CAPACITY OF COOLING EQUIP.																			
17 C.F.M. REQUIRED																			

Abbreviations for Noting Reg. Loc.:
B - Backboard, L.W. - Low Wall, H.W. - High Wall,
PD - Floor Diffuser, LWD - Low Wall Diffuser, CD - Ceiling Diffuser

4 COMPLETE DATA is tabulated on this worksheet to assure accuracy in the overall estimate

TABLE 1
OUTSIDE DRY AND WET BULB TEMPERATURES
FOR SUMMER AIR CONDITIONING ESTIMATES

STATE and CITY	DESIGN TEMP F In Common Use		DESIGN TEMP DIFFER- ENCE
	DRY BULB	WET BULB	
OHIO			
Akron	95	75	15
Cincinnati	95	75	15
Cleveland	95	75	15
Columbus	95	75	15
Canton	95	75	15
Sandusky	95	75	15
Toledo	95	75	15

5 THIS SECTION of Table 1 is used to find the design wet and dry bulb temperatures for the residence discussed. Higher temperatures than those listed are occasionally encountered, but it is uneconomical to design the system for these brief periods.

ture. This gives us a design operating temperature difference of 95 F — 80 F, or 15 F. This, along with other pertinent information of a general nature such as the owner's name and address, is entered at the upper left hand corner of the heat gain calculation worksheet (Fig. 4).

Shortcut Method Inadequate

The next logical step is to provide reference numbers for each of those rooms for which we wish to provide cooling. This, you will note, has been done in the first and second floor plans (Figs. 2 and 3). In this way, we can systematically proceed, room by room, throughout the entire space to be conditioned, calculating the load of each individual room as we proceed.

If we were merely sizing the equipment, a somewhat shorter approach might well be taken by considering the entire structure as one single, very large room. We would arrive at the same total results in the way of an overall cooling load, but would have little or no idea as to the individual cooling requirements of each room. The latter, of course, is desirable from a practical standpoint if we are to know how or in what proportions we should divide the total cooling output of the equipment in order to provide just the proper amount of cooling for each room.

Another objection to the shortcut method in this particular case arises from the presence of warm ceilings over part of the first floor living area. These warm ceilings together with other offsets already present in the home would provide us with a very complicated overall shape on which to base our calculations. Experience shows us that in cases such as this we can get a much more accurate sizing recommendation (with just a little more work) by using the individual room approach — and at the same time we will be well on our way toward completing duct and register layouts. In order to tie the heat gain calculation worksheet (Fig. 4) to the plan, we fill in items 1 and 2 at the top left of the sheet. This provides us with a ready means of checking back and forth between individual rooms on the plan and the worksheet with a minimum of confusion. (Symbols used throughout the heat gain calculation worksheet are explained at the top of the sheet.)

As has been previously pointed out, residential cooling loads arise primarily from heat gains through windows, walls and ceilings. Items 3 and 4 of the heat gain calculation worksheet are provided as a means of systematizing the calculation involving these areas.

How Walls Should Be Measured

Since the rate of heat gain varies with the angle at which the sun will strike any given wall, we must take care, from the very beginning of this calculation, to separate these areas according to whether they face north, south, east or west. With a scale, we measure along the north wall of the living-dining room combination (Fig. 2) and note that the overall length of this wall from the outside corner to the kitchen partition is 10 ft. The same holds true for the north wall of the kitchen, but the north wall of the bath we note to be only 7½ ft long. We proceed around the house in this same manner taking care to include in the length of the outside wall of each room the length of any outside wall of any closet which might open into it. Thus, in the case of the master

bedroom (Fig. 2), we add to the length of its east wall (13½ ft) another 2½ ft for the outside wall of the closet. (Since the closet opens into the bedroom any heat gain which it undergoes will be felt in the bedroom as well).

Where distances as measured do not come out in even feet or half feet, we round off the measured distance to whichever is the nearer, i.e., a wall which measures 8 ft 8 in. would be recorded as 8½ ft, since 8 in. is closer to the half foot or 6 in. than it is to the full foot or 12 in. In item 4 (Fig. 4), we record that the floor-to-ceiling height for each of the rooms on both the first and second floors is 8 ft. The gross exposed wall area to be calculated under item 5 consists of the total area of each outside wall for each room under consideration and includes windows, doors and any ventilation openings as well as the true wall area itself. It is simply the product of the ceiling height times the running feet of outside wall, as tabulated under item 3. Remembering again that we must differentiate one wall from another according to its compass direction, we list all north facing areas on one line, east facing areas on another, south on a third and west on a fourth line.

Heat Gain Through Windows

Heretofore, we have proceeded exactly as though we were making a winter heat loss calculation, with the sole exception that we have been careful to separate our walls according to whether they faced to the north, east, south or west. We are now ready to enter upon the mechanics of the actual cooling load calculation. Since the rate of heat gain through glass surfaces is considerably larger than that through walls and has an almost instantaneous effect on the indoor temperature levels, we must pay particular attention to windows and doors. For this reason, we carefully calculate the overall window areas for each room, again taking care to separate them according to compass direction. The proper procedure for calculating

these areas is outlined on pages 13-18 of Manual 11. The data on these areas, along with the other information we have gathered, is shown according to its proper arrangement in the sample worksheet (Fig. 4).

As has been mentioned, the residence in question faces to the south. Moreover, only the north, east and west windows are provided with awnings. This means that when the sun rises in the morning, direct impingement of its rays upon the east windows will be prevented by the presence of the awnings. This same situation, of course, will hold in the late hours of the day when the sun strikes on the west wall. At no time during the day can the sun shine directly upon the windows located on the north side of the house. This means that we can expect our highest rate of glass heat gain to occur at noon, when the sun shines directly upon the southerly facing, unprotected glass areas of the home. A casual inspection shows us that a major portion of the south wall of the home is glass. Experience tells us that, at best, wall heat gains on an individual square foot basis will be only about one-eighth to one-tenth the amount of the glass heat gains. In other words, 1 sq ft of glass will transmit the same amount of heat to the interior as 8 to 10 sq ft of insulated wall. It is obvious, therefore, that from an overall cooling load standpoint, the peak cooling load on this home is going to occur at, or very close to, the noon hour. This, of course, will also be the period of the greatest load upon the air conditioning equipment. We should, therefore, base our calculations upon this time of the day.

Reference to Table 8 of Manual 11 (Fig. 6) shows us that for the noon hour, single glass on the north of the house will transmit 34 Btu per hr of heat per sq ft of exposure at a design temperature difference of 15 F. This factor is, therefore, entered on the first line of item 6 of the heat gain calculation worksheet. At this same time of day, a square foot of common single glass facing to the east will transmit 36 Btu per

hr. This we enter on the second line opposite the east compass direction. In the same way, we note that on the south, the glass heat gain factor (GHG) should be 117 and on the west, 36. Table 10 (Fig. 7) tells us that we should modify our glass heat gain factors by a shading factor of 0.30 for each of those glass areas provided with an outside awning. For this reason, since all windows facing north, east and west compass directions are provided with awnings, we include under the SF (shading factor) column of the heat gain calculation worksheet a 0.30 factor for each of these exposures. All that remains is to multiply the area of each window exposure for each room by its appropriate glass heat gain factor, and where applicable, by its shading factor. For example, in the living-dining room combination on the north wall, we have 40 sq ft of glass. To find the heat gain through this glass, we multiply 40 sq ft x 34 Btu per hr per sq ft x 0.30, our shading factor. The result is an estimated heat gain of 408 Btu per hr through this glass area. This we enter on the cooling load sheet opposite the area in question.

Reducing Glass Heat Gain

In this same living-dining room combination on the south, we have 84 sq ft of unprotected glass. Here we multiply the area, 84 sq ft, by the glass heat gain factor, 117 Btu per hr per sq ft, to arrive at a total glass heat gain figure of 9828 Btu per hr. If the owner of this residence would agree to provide an awning for this particular window exposure, we could also apply the 0.30 shading factor here and — under these conditions — the overall glass heat gain would be reduced from 9828 to 2948 Btu per hr — or a saving of a little over a half ton (9828 Btu per hr — 2948 Btu per hr = 6720 Btu per hr) in the overall heat gain load. This points out the desirability of outside awnings as a means of reducing the cooling load and, consequently, the size and cost of the equipment needed to provide a satisfactory comfort level under design conditions.

TABLE 8
GLASS HEAT GAIN CONSTANTS FOR
SUMMER AIR CONDITIONING
IN RESIDENCES

Design Temperature Difference 15°

		Use 4:00 p.m. table and Table of Heat Gain Constants for Walls for Averaged Gain when sizing equipment. Use noon or 8:00 a.m. table for checking south or east rooms with heavy glass exposure or for minimum air delivery.					
		Single Glass	Single Plate	Heat Abs. Plate	Double Common Glass	Double Plate	Heat Abs. Glass Outside Plate Inside
4:00 pm	N	37	36	31	27	25	21
	NE	44	38	50	26	34	35
	E	44	41	63	28	42	45
	SE	44	39	56	27	38	40
	S	36	35	32	25	24	21
	SW	161	144	91	139	106	67
	W	230	204	133	189	152	93
	NW	172	154	95	140	113	71
Noon	N	34	33	26	24	23	18
	NE	34	33	26	24	23	18
	E	36	35	27	26	25	19
	SE	82	77	52	65	61	46
	S	117	109	69	94	86	61
	SW	82	76	51	65	60	44
	W	36	35	27	26	25	19
	NW	34	33	26	24	23	18
8:00 am	N	18	16	9	15	12	7
	NE	153	139	78	129	101	60
	E	211	191	107	178	143	83
	SE	141	129	73	122	96	57
	S	17	14	10	14	11	7
	SW	15	13	9	12	10	6
	W	15	13	9	12	10	6
	NW	15	13	9	12	10	6

6 HEAT GAIN through the windows is estimated for the noon hour, since the peak cooling load on this house will occur at, or close to, this time

TABLE 10
SHADING FACTORS FOR USE WITH
CONSTANTS SHOWN IN TABLE 8

	Dark	Med.	Lt.	Alum- inum
Awning outside, fully shaded or venetian type awning	.30	.30	.30	.30
Roller shade inside, fully drawn	.80	.63	.45	
Roller shade inside, half drawn	.90	.81	.72	.70
Outside shade screen, set at 30°				.30

7 SINCE WINDOWS FACING north, east and west are to be provided with awnings, a shading factor is entered for each of these exposures on the heat gain calculation worksheet

TABLE 7
HEAT TRANSMISSION COEFFICIENT "U"
FOR VARIOUS TYPES CONSTRUCTION

DESCRIPTION	Heat Transmission Coefficient U
WINDOWS	
No. 1	
(a) Glass, single	0.91
(b) Same as (1a) with tight fitting storm sash	0.45
(c) Storm sash put up and taken down as usually will probably be some fitting	0.75
(d) Double glass with sealed air space between	0.65
Window	
EXPOSED WALLS	
No. 8 Brick Veneer	
(a) Brick veneer 4" brick, paper, wood sheathing, studs, lath and plaster	0.27
(b) Same as (8a) substituting 1/2" rigid insulation for lath	0.20
(c) Same as (8a) with 2" blanket or bat insulation between studs	0.12
(d) Same as (8a) with 1 1/2" mineral wool or equivalent between studs	0.09
(e) Same as (8a) substituting 1 1/2" rigid insulation in place of wood sheathing	0.21
Brick Veneer	
CEILINGS WITH ATTIC SPACE ABOVE	
No. 19 No Floor	
(a) Lath and plaster on floor above (No attic vent)	0.42
(b) Same (Ventilated attic)	0.40
(c) Same as (19a) substituting 1/2" rigid insulation for lath	0.22
(d) Same (Ventilated attic)	0.20
(e) Same as (19a) with 1/2" rigid insulation on top of joists	0.18
(f) Same (Ventilated attic)	0.16
(g) Same as (19a) with 2" blanket or bat insulation between joists	0.12
(h) Same as (19a) with 1 1/2" mineral wool or equivalent between joists	0.09
With Roof Above	
No. 20 With Floor	
(a) Lath and plaster with tight floor above (No attic vent)	0.26
(b) Same (Ventilated attic)	0.24
(c) Same as (20a) substituting 1/2" rigid insulation for the lath	0.16
(d) Same (Ventilated attic)	0.14
(e) Same as (20a) with 2" blanket or bat between joists	0.12
(f) Same as (20a) with 1 1/2" mineral wool or equivalent between joists	0.09
With Roof Above	

8 SELECTED SECTIONS from Table 7 identify the walls of the home as type 8-d, the knee walls (interior partitions) on the second floor as type 19-6, and the warm ceilings as type 19-h or 20-f construction. The appropriate U factors are entered on the worksheet

Somewhat less advantage could otherwise have been gained were we to substitute single plate or heat absorbing plate or double common glass or one of the other varieties itemized in Table 3 of Manual 11 for the single glass. On the other hand, since the owner would not agree to the idea of awnings, perhaps this expedient might well have been resorted to as a means of reducing the amount of this single heat gain without interfering with the outside view which he found desirable.

Now we proceed with the remainder of our window and door heat gain calculations — multiplying out each of the areas by its appropriate factors as demonstrated in the preceding paragraphs. We treat each of the door areas exactly as though

it were of ordinary single glass construction, since any actual differences in heat gain behavior is very slight.

Figure Exposed Wall Area

After completing the calculation of the individual gains through the windows and doors, we come to the calculation of the heat gain room by room for each of the net exposed wall areas around the outside of the structure. These net exposed wall areas are simply the difference between the gross exposed wall area as listed under item 5 of the cooling load sheet and the total area of the windows and doors in those walls as itemized under item 6 of the cooling load sheet.

Thus, the net exposed wall area on the north of the living-dining room combination is equal to the gross area, 80 sq ft, minus the area of the windows on the north, or 40 sq ft. This gives a final answer of 40 sq ft of net exposed wall area for the north wall of the living-dining room combination. On the south of this same room, the net wall area is equal to 152 sq ft of gross wall area minus 84 ft of glass or a total of 68 sq ft. In this same manner, we proceed across the sheet, room by room, recording in each case the net exposed wall area opposite its appropriate compass direction, as illustrated in Fig. 4.

Find Wall Heat Gain

We identified this home as being of brick veneer construction having plaster-coated rock lath inner sheathing and 3 5/8 in. of loose rock wool fill in the stud spaces. Table 7 of Manual 11 (Fig. 8) identifies this wall as being of Type "8-d", having a U factor of 0.09 Btu per hr per sq ft per deg F. This factor we carefully record opposite each of the compass directions in item 7 of the heat gain calculation worksheet (Fig. 4).

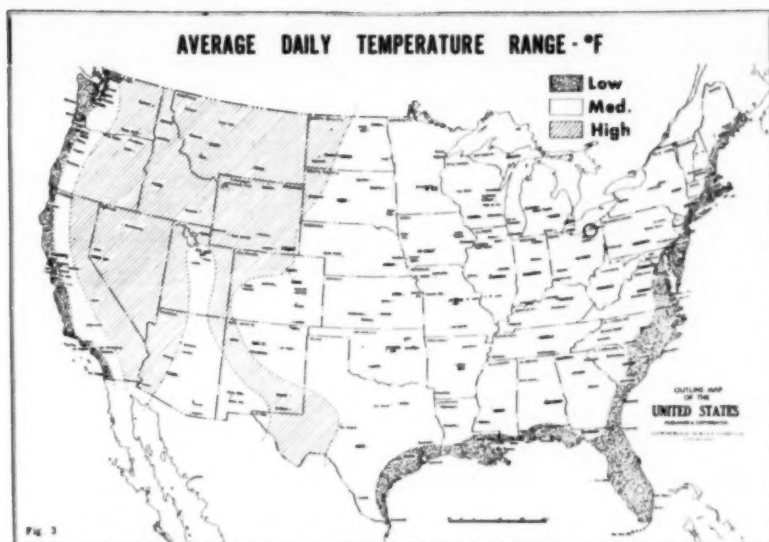
This structure might have been assembled with varying types of wall construction. That is, it might have had a stone veneer front with ordinary wood facing or shingled exterior siding on the rear and either sides. Were this the case, we would

have had to pick a U factor for each compass direction corresponding to the basic type of construction involved in each of these walls. In our case, all four exterior walls of this structure are of the same construction which, of course, considerably simplifies our calculations.

The residence in question is located in the general Cleveland area; therefore, reference to the map on Page 9 of Manual 11 (Fig. 9) quickly identifies it as being typically subjected to a medium-average daily temperature range. In order to select the proper wall heat gain constant, therefore, we refer to Table 13 (Fig. 10) which pertains to residences located in medium daily temperature range areas. Our design temperature difference is 15 F, so we have only to concern ourselves with that portion of this table corresponding to this particular design temperature difference. Accordingly, we note that for a north exposure at both 8 a.m. and 4 p.m., a 4 in. brick or stone veneer on frame calls for a heat gain factor of 10 F.

You will recall that we are basing our heat gain calculation on 12 noon. We shall, therefore, have to use our judgment as to what the heat gain factor will be at noon based on its value at 8 a.m. and 4 p.m. Since we note that the north side heat gain constant shown in the table does not change between either of these times, we feel safe in selecting a heat gain factor of 10 F for the north wall of our sample dwelling. By the same sort of reasoning, we select 12, 16 and 18 F as the heat gain factors for the east, south and west walls using the L column, since the brick of which this house is constructed is of a light yellow-gold color.

To obtain the heat gain in Btu per hr through each of the net exposed wall areas itemized for each room (in item 7 of the worksheet, Fig. 4), we multiply the area in question by its appropriate heat gain factor and U factor. For the north net wall area of the living-dining room combination, then, the overall Btu per hr heat gain will be 40 sq ft x 0.09 Btu per hr per sq ft per deg F x 10 F or, 36 Btu per hr. For the



9 THE HOME, being in the Cleveland area, is subjected to a medium-average daily temperature range, according to this Manual 11 map

west wall, the heat gain will be $178\frac{1}{2}$ sq ft x 18 F x 0.09 Btu per hr per sq ft per deg F, or, 290 Btu per hr.

Interior Partitions Affect Load

Until now, we have not considered interior partitions, since on the first floor at least, under comfort conditions, the temperature on either side of these interior partitions

would be essentially the same and, therefore, no appreciable heat transfer through them should be anticipated. On the other hand, we have on the second floor three room partitions subjected to quite different circumstances (Fig. 3). Two of these separate the small triangular area bounded by the first floor ceiling, the dormer wall and the main roof line of the house proper.

Experience tells us that the temperatures in such areas on a hot summer day can reach far beyond the comfort level. We must, therefore, take steps to estimate the amount of heat in Btu per hr which they are apt to transmit into the conditioned space (i.e., the adjoining bedrooms on a design day. To do this, we multiply the running foot length of their exposure to the conditioned space by their ceiling height. (In order to save time in our calculations, we take this ceiling height to be 8 ft, although we know that, due to the slope of the roof, this condition will not hold at all points along their length. However, the few square feet of error in the overall calculated area which we get as a result of this shortcut is not going to be big enough to measurably hinder the accuracy of our results.)

Note also that when considering these warm partitions, we no longer

pay any particular attention to compass direction, since the sun, of course, does not directly shine upon these walls. The second warm partition runs along the front of the finished second story, almost directly under the ridge line of the main house roof, and serves to partition off a storage space. The builder saw fit to provide insulation for all three of these knee walls. We are, therefore, able to identify them as being of typical "19-g" construction as described in Table 7 of Manual 11 (Fig. 8) and as having a U factor of 0.12 Btu per hr per sq ft per deg F. This we enter as item 8 of our cooling load calculation worksheet (Fig. 4).

The treatment of warm ceiling areas and warm partition areas is outlined in greater detail in paragraphs 4-33 through 4-38 on pages 15 and 19 of Manual 11. Here we find that we should select our heat gain factor as being equivalent to the roof heat gain factors as given in Table 13 (Fig. 10) for residences located in medium daily temperature range areas. While it has not been heretofore mentioned, the roof of this structure is of dark gray asphalt shingle construction. We, therefore, select a heat gain factor of 50 as being appropriate for this application. This factor is entered in the appropriate column opposite "Warm Partitions" and "Warm Ceilings" (items 8 and 9) as shown in the sample heat gain calculation worksheet (Fig. 4).

We note that due to the offsets provided at the second story, warm ceilings will inevitably occur over the living room, entry hall and den at the front of the house directly below the second floor storage area. They will also be found over the dining room and master bedroom at the northwest and northeast corners of the house. These warm ceilings are not floored over at all points. However, we notice that in either case, since they are provided with $3\frac{5}{8}$ in. or more of loose rock wool fill, the construction corresponds either to type "19-h" or "20-f" as described in Table 7 of Manual 11

(Please turn to page 132)

TABLE 13

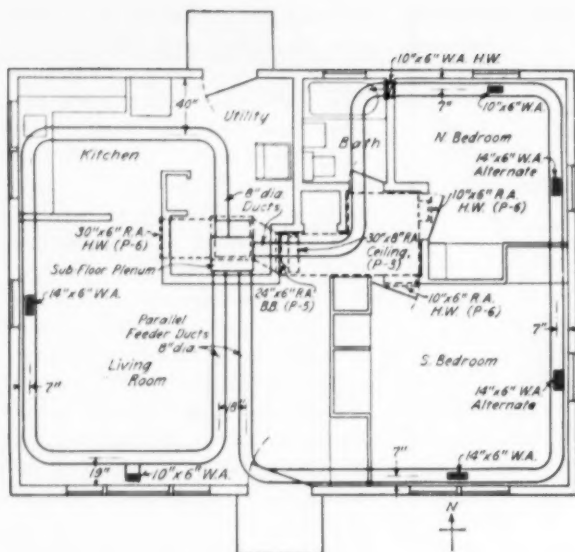
WALL HEAT GAIN CONSTANTS FOR SUMMER AIR CONDITIONING IN RESIDENCES

FOR MEDIUM DAILY TEMPERATURE RANGE

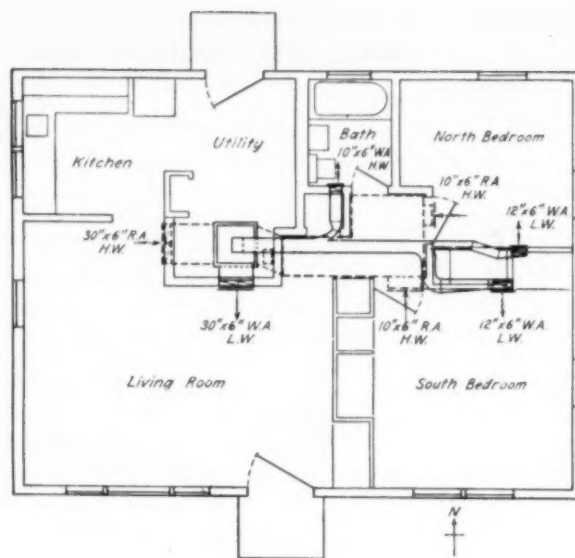
Use L columns for walls with light exteriors, D columns for those with dark exteriors

Design Temp. Difference	Direction Wall Faces	Frame		4" Brick or Stone Veneer on Frame		8" Hollow Tile or 8" Cinder Block	
		Ran 4m	D. L.	D. L.	D. L.	D. L.	D. L.
15°	N N	14	14	10	10	6	6
	NW NE	14	14	12	10	10	6
	W E	14	14	12	12	20	12
	SW SE	16	14	18	14	20	14
	S S	26	20	26	16	24	14
	SE SW	40	28	32	22	12	10
	E W	40	28	26	18	10	8
	NE NW	24	20	12	12	8	6
	Roof	50	33				

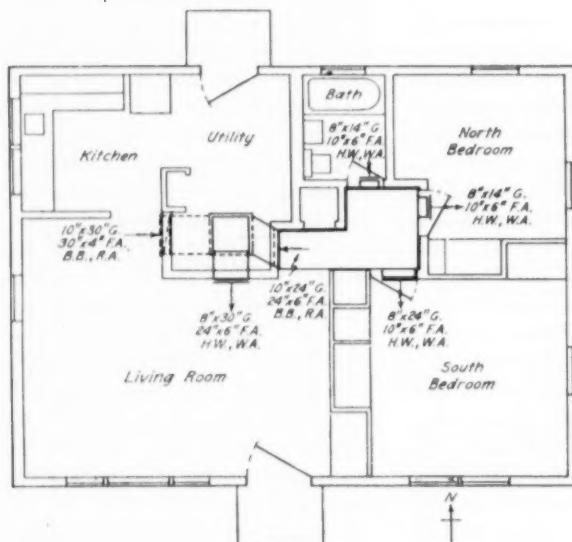
10 THE PORTION of Table 13 shown provides the wall heat constant, since the home is in the medium temperature range, and since the design temperature difference is 15 F. Other portions of the table, not shown, cover temperature differences of 10, 20, and 25 F



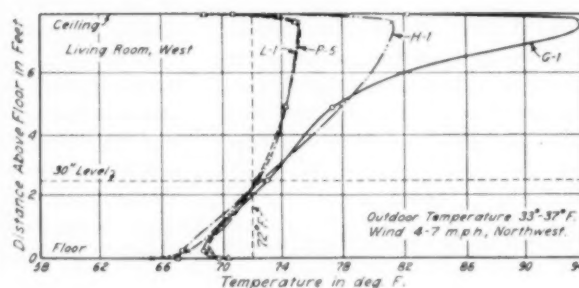
1 A TWO LOOP perimeter system . . .



2 A LOW WALL forced air system . . .



3 A GRAVITY system, and a high wall forced air system are evaluated . . .



4 ON THE BASIS OF such comfort factors as room air temperature gradients

Four Warm Air Systems Analyzed

The four systems, installed in Research Residence No. 3 at the University of Illinois, were also compared on the basis of thermostatic control, temperature balance between rooms, floor surface temperatures, and minimum fuel consumption

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THE FIRST STUDIES of a two loop warm air perimeter heating system (Fig. 1) considered very promising by the field investigation committee of the National Warm Air Heating and Air Conditioning Association were described in last month's article. In order to better evaluate the performance of this new perimeter heating system in the Research Residence, three other heating systems also were installed for study. These three systems were of conventional design and introduced no heated air into ducts or spaces below the concrete floor slab. In this article the results obtained from the three conventional systems will be compared with those from the two loop perimeter system.

The main features of the three convection systems studied were:

Low Wall Forced Air System (designated as Series L). In this system, shown in Fig. 2, the warm air was delivered to the bedrooms and to the bathroom through an insulated trunk duct in the attic. The only high wall register used was in the bathroom. Warm air for the living room was delivered directly from the furnace bonnet through a conventional wall stack, to the low wall register in the north wall of the living room. Return air intakes were located above the doors of the bedrooms and high in the wall between the utility room and the dining area. The duct system was simple and compact, and was designed in accordance with NWAHACA Manual 7. In general, the operating conditions for the burner and blower were the same for both the low wall and perimeter systems.

High Wall Forced Air System (designated as Series H). As shown in Fig. 3, warm air was delivered through a box plenum located above the furred ceiling in the hall to registers located above the doors of the bathrooms and bedrooms. The large register for the living room was located about 7 ft above the floor in the north wall of the living room. The return air intakes in the hall and dining area were both located in the baseboard of the utility room walls. The registers and return air intakes were sized in accordance with Manual 7, but the duct sizes were based on the requirements for the gravity system. Since the warm air duct

This article is condensed from a complete report in University of Illinois Engineering Experiment Station Bulletin 403, *Comparative Performances of Two Warm Air Perimeter Systems and Three Convection Systems*, by M. E. Childs, R. W. Roose, H. T. Gilkey, and S. Konzo. Figs. 1 through 5 are from this bulletin.

system was oversized for forced air flow, and since no changes were made in blower speed, the resulting air-flow rate was higher than that for the low wall system. The temperature rise through the furnace was only 70 F under prolonged burner operation. For both the low wall and high wall systems, no warm air register was located in the kitchen-utility area. However, the furnace in the utility space was exposed and not enclosed, so that the heat from the casing and flue pipe was assumed to escape into the kitchen-utility area.

Gravity System (designated as Series G). For operation with the gravity system (Fig. 3) the blower and the division panel which separated the blower compartment from the upper part of the furnace were both removed from the furnace casing, and the conventional forced air registers and return air intakes were replaced with those suitable for gravity operation. The design of the duct system was based essentially on the procedure given in NWAHACA Manual 5.

The results obtained from these three convection systems have been compared with those of Series P-5 for the two loop perimeter system. Most of the experimental data for all four series was obtained when the outdoor temperatures ranged between 30 and 40 F, and the comparisons were confined to this range. In this temperature range, the blower operation was practically continuous for both the low wall and high wall systems. Table 1 summarizes the operating conditions for the three convection systems.

Thermostatic Control

One index of performance is the normal variations in living zone temperature during the cyclical operation of the burner. Since the same furnace, thermostat, and fan switch settings were used for the forced air systems under study, any difference in temperature control could be attributed to the method of delivering heat to the rooms. In general, the various systems showed the following temperature variations, in decreasing order of merit:

An average variation of 0.5 F was experienced with the two loop perimeter system.

A variation of about 1.0 F was obtained in the living zone with the high wall forced air system. In the upper part of the room, near the ceiling level, the variations were larger and of the order of 3 to 4 F per cycle.

Variations of from 3 to 4 F were obtained in the living zone with the low

How We Got Where We Are In WARM AIR

PERIMETER HEATING

the eighth in a series
planned to tell about:

► Investigations in the Research Residences at the University of Illinois

► Design and installation data (condensed from manuals published by the National Warm Air Heating and Air Conditioning Association)

► Specific phases of warm air heating

... in articles so far:

► heating basementless homes

► warm air ceiling panels

► heating slab floor homes with ceiling and floor panel systems

► floor panel-convection heating for slab floor homes — partially open and completely open

► survey of field practices

► new research residence built

► comparison of two loop perimeter and three convection systems

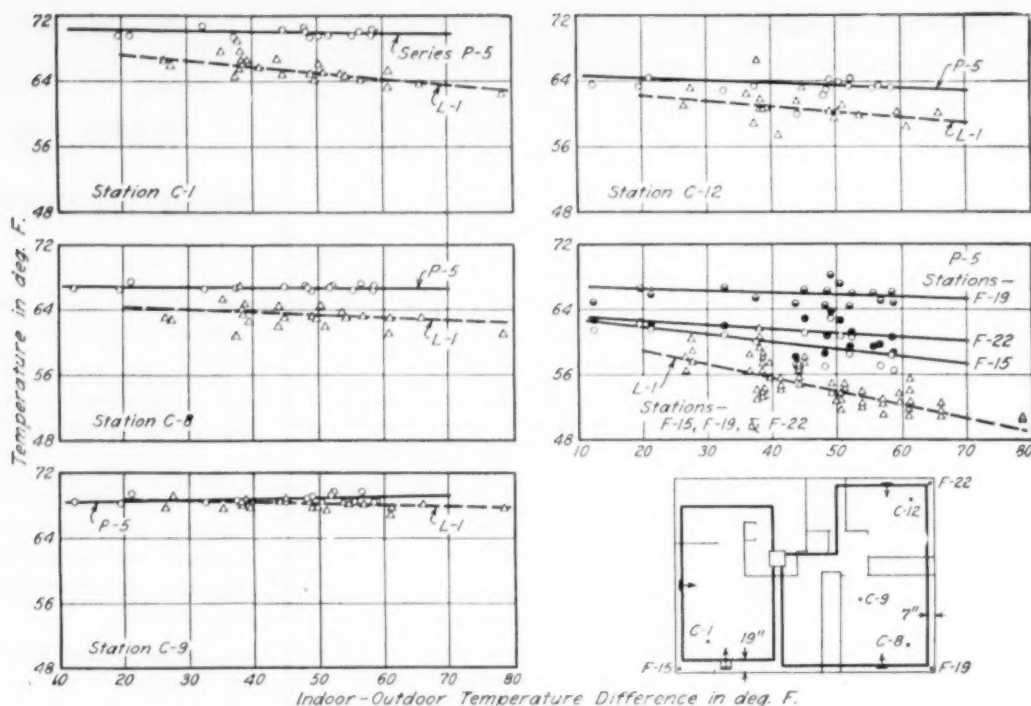
... in articles to come:

► comparison of perimeter loop and two loop system

► loop vs. radial system

► perimeter laboratory studies

► crawl space heating



5 THE FLOOR SURFACE TEMPERATURE at any given spot did not change with the weather when the perimeter system was used. However, with the convection systems, floors became colder as the weather became more severe

wall forced air system. These variations in room air temperature were accompanied by 20 F variations in the register air temperature.

The two loop perimeter system provided the most constant temperatures in the living zone, probably because of the flywheel effect of the floor panel heating above the embedded ducts.

Temperature Balance an Index

Another performance factor is the temperature balance maintained between different key rooms in the house. For this purpose, the differ-

ences in temperature between the living room and three other rooms were tabulated (Table 2). Averaging the values shown in the first three columns, we find:

The average difference was about 1.1 F for the two loop perimeter system.

For the high wall system the difference was about 2.2 F.

For the low wall system the difference was about 2.0 F.

For the gravity system the difference was about 3.3 F.

The two loop perimeter system showed a better balance of room air temperatures.

The temperature difference between the warmest and coolest areas

of the living room are also of interest, since this room is the key room of the house. The two loop perimeter, high wall, and gravity systems showed about 2 F differences, and there was little choice between the systems.

Vertical Temperatures Differ

From a comfort standpoint it is highly desirable to have a uniform temperature from floor to breathing level. Usually in any convection system the air temperature near the floor will be cooler than that in the upper part of the room. The de-

Table 1—Experimental Conditions for the Three Convection Systems

Series	Temp. Rise Through Furnace F	Air Flow Rate, cfm	Location of Registers				Location of Return Air Intakes			
			Liv. Rm.	S. Bdrm.	N. Bdrm.	Bath	Hall	Din. Area	S. Bdrm.	N. Bdrm.
L (Low Wall)	100	480	LW	LW	LW(S.)	HW(SW.)	—	HW(E.)	HW(NW.)	HW(SW.)
H (High Wall)	70	680	HW	HW	HW(SW.)	HW(SE.)	BB(W.)	BB(E.)	—	—
G (Gravity)	Variable	Variable	HW	HW	HW(SW.)	HW(SE.)	BB(W.)	BB(E.)	—	—

Note: HW = High Wall Register, LW = Low Wall Register, BB = Baseboard Register.

Operating Conditions common to all series: a) fuel input, Btu per hr = 65,000; b) thermostat setting = 72 F; c) fan switch settings for Series L and H, cut-in = 100 F, cut-out = 80 F; d) limit switch settings for Series L and H, cut-out = 200 F, cut-in = 185 F; e) limit switch settings for Series G, cut-out = 225 F, cut-in = 200 F; f) house unoccupied; g) no filters in unit.

tailed values of the temperature differentials are shown in Table 3 for the six rooms in the house, along with the averages for the two vertical heights in the room. The temperature differentials obtained with the low wall system showed considerable improvement over those obtained with the high wall and gravity system, but were larger than those for the perimeter system.

Typical room air temperature gradients obtained at the west living room measuring station are shown in Fig. 4. Note that the floor surfaces were warmer than the room air for both the two loop perimeter system and the gravity system. It is not difficult to understand how warm floors will be obtained with a perimeter system, since the heat ducts are embedded in the floor. In the case of the gravity system, however, the reason may not be apparent, until it is realized that the high temperatures at the ceiling surface (82 F) resulted in a panel heating effect and the floor surface was warmed by radiation from the warm ceiling.

Floor Surface Temperatures

One of the avowed purposes of the perimeter system was to maintain warmer floor surfaces in a slab-floor type of house. Thorough studies of floor surface temperatures with each of the four systems indicated that the two loop perimeter system provided warmer floors than any of the convection systems. Little difference was noted between the three convection systems.

In Fig. 5 are shown the temperatures observed at specific points in the house, the stations being designated in the diagram at the lower right hand corner as C-1, C-8, C-9, C-12, F-15, F-19, and F-22. The latter three stations were at the exposed corners of the house. The following observations can be made:

In the central area of the house (Station C-9) little difference was noted between the perimeter and convection systems.

At a distance of 3 ft from the outside walls (Stations C-1, C-8, and C-12) the temperatures were substantially lower for the convection system than for the per-

Table 2—Temperature Differences Between Rooms for Two Loop Perimeter System and Three Convection Systems (Observed at Sitting Level, Outdoor Temp., 30 to 40 F)

Series	Average Difference Between Living Room and				Maximum Differences Observed Between
	1 S. Bdrm.	2 N. Bdrm.	3 Bath	4 All Three	
G (Gravity)	2.8	3.3	3.7	3.3	Liv. Rm. (W. Part) and Bath 7.6
H (High Wall)	2.7	2.6	1.3	2.2	Liv. Rm. (W. Part) and S. Bdrm. 4.4
L (Low Wall)	1.5	2.5	2.2	2.0	Liv. Rm. (E. Part) and Bath 8.0
P-5 (Two Loop Perimeter)	1.0	1.3	1.1	1.1	Liv. Rm. (E. Part) and N. Bdrm. 1.6

Table 3—Room Air Temperature Differentials for Two Loop Perimeter System and Three Convection Systems (Outdoor Temp., 30 to 40 F)

Series	Between Floor Level and Breathing Level					Averages
	Liv. Rm. (W. Part)	Liv. Rm. (E. Part)	N. Bdrm.	S. Bdrm.	Kitchen- Utility	
G (Gravity)	8.4	5.8	10.8	8.0	8.5	8.5
H (High Wall)	10.1	8.1	12.5	9.4	8.6	10.3
L (Low Wall)	6.9	6.3	6.1	5.5	7.5	6.8
P-5 (Perimeter)	4.9	1.7	4.3	4.9	4.1	4.0
Series	Between Floor Level and Ceiling Level					Averages
	Liv. Rm. (W. Part)	Liv. Rm. (E. Part)	N. Bdrm.	S. Bdrm.	Kitchen- Utility	
G (Gravity)	24.9	30.9	24.7	24.8	15.9	24.5
H (High Wall)	15.5	9.7	15.8	14.4	10.2	13.7
L (Low Wall)	7.7	6.7	6.9	5.7	10.9	9.7
P-5 (Perimeter)	5.7	5.2	5.9	8.0	11.1	7.5

Table 4—Summary of Performance Data for Burner and Furnace (1949-50 Heating Season)

	Gravity (G)	High Wall (H)	Low Wall (L)	Two Loop (P-5)
Experimental Conditions				
Air Flow Rate, cfm	...	680	480	480
Temperature Rise through Furnace, F	...	70	100	100
Fan-Switch Settings	...	Cut-in: 100 Cut-out: 80	Cut-in: 100 Cut-out: 80	Cut-in: 100 Cut-out: 80
Summary of Values for an Indoor-Outdoor Temperature Difference of 35 F				
(a) Blower Operation, hr per day	...	21.4	23	23
(b) Blower Cycles, per 24 hr	...	24	10	5
(c) Electrical Input to Blower Motor, watt-hr per day	...	2400	2400	2450
(d) Bonnet-Air Temperature, F, Av.	139	103	108	110
(e) Burner Operation, hr per day	10.8	9	8	9
(f) Burner Operations, per 24 hr	90	83	80	100
(g) Flue-Gas Temperature, F, Av.	395	315	315	335
(h) Fuel Consumption, cu ft of gas per day	690	600	510	605
(i) Percentage Difference in Fuel Consumption from Series P-5	+14	-1	-16	0

Table 5—Comparative Performance of Two Loop Perimeter System and Three Convection Systems

	Two Loop Perimeter	High Wall Forced Air	Low Wall Forced Air	Air Gravity
Thermostatic Control	1	2	3	4
Temperature Balance between rooms	1	3	2	4
Temperature Differential from floor to breathing level	1	4	2	3
Temperature Differential from floor to ceiling level	1	3	2	4
Floor Surface Temperatures in middle of house	1	No difference in four systems		
Floor Surface Temperatures near perimeter of house	1	No difference in three systems		
Minimum Fuel Consumption	2	2	1	3

imeter system. The same was true for the stations at the exposed corners.

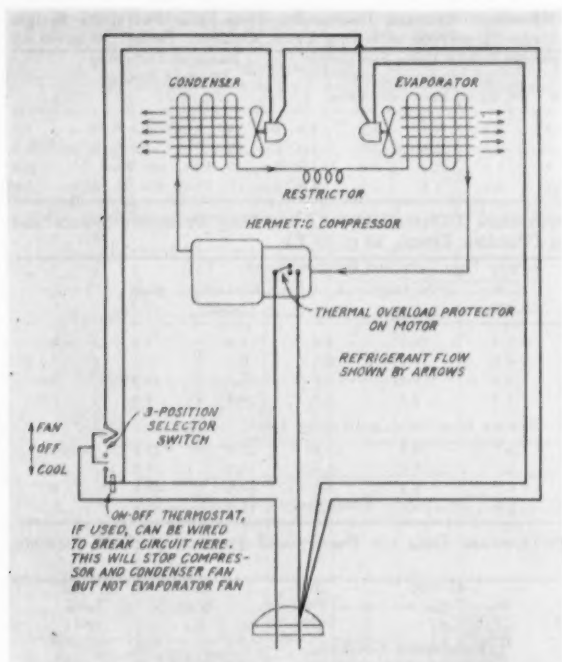
As shown by the five graphs in Fig. 5, the floor surface temperatures at any given spot, either near the center of the house or near the exposed edges, did not change with the weather when the perimeter system was in use. In the case of the convection systems, however, the temperatures at any given spot on the floor tended to become colder as the weather became more severe.

The floor surface temperatures experienced with the two loop perimeter system were not considered to be entirely satisfactory and could be

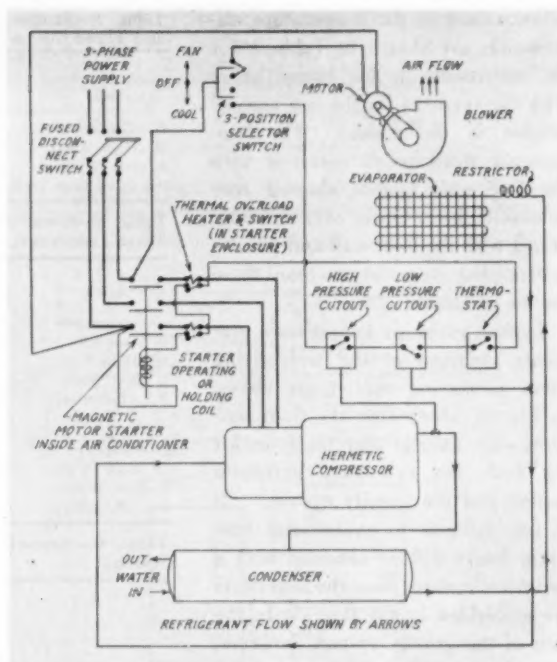
improved. However, they were more satisfactory than those with any of the three convection systems.

Compare Fuel Consumption

Complete performance data for the burner and blower was obtained over a wide range of indoor-outdoor temperature differences. The data shown in Table 4 constitutes averages obtained from the performance curves and covers an average winter day. With the exception of the fuel (Please turn to page 160)



1 THIS CONTROL SCHEME for a small unit with an air cooled condenser utilizes a manual selector switch as the only operable control. Insertion of a thermostat would give automatic on-off control



2 SELF-CONTAINED air conditioners (2 to 15 tons or larger) require the use of magnetically operated starting equipment for automatic control. Thermostats usually are of the return air type

How to Control Cooling Equipment

- small units
- self-contained conditioners
- cooling towers
- cooling units added to warm air systems

... with electrical systems for regulating temperature and humidity

S. W. Reid

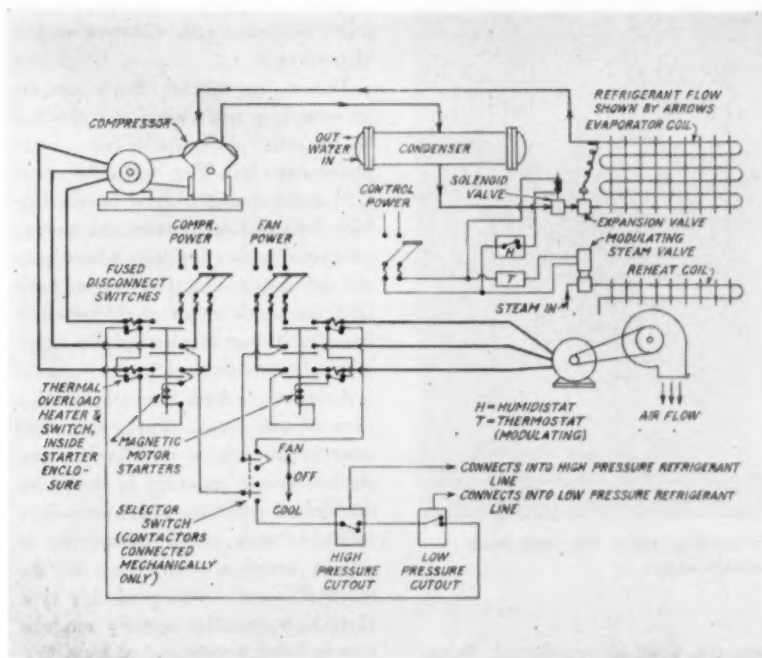
**Air Conditioning Engineer
Gilbert Associates, Inc.**

MOST MODERN MACHINES, processes, and appliances would be useless without some means of control. Consider the value of the simple thermo-

stat in an electric iron, or the sequencing device in an automatic washer. Controls are the brains of machines. Properly applied, they are the means whereby we predetermine machine behavior or process results.

Comfort air conditioning is a process for removing heat. When con-

trolled, this process gains three desirable characteristics it would not otherwise have. First, the controls permit the process to be operated automatically to maintain certain desired conditions of temperature or humidity or both. Second, they permit the process to proceed safely by providing means for automatically



3 THIS SYSTEM for controlling temperature and humidity is usually field-assembled

stopping it under certain abnormal conditions. Third, they permit the process to proceed economically, by automatically stopping it when it is not required.

Before we proceed with a discussion of the several basic types of electrical control systems, let us examine an air conditioning system from a control standpoint. When we speak of control, we imply that there are variables subject to control. What are the variables which can affect an air conditioning system?

What Variables Affect Cooling?

As discussed in some detail in earlier articles of this series, the mechanical cooling part of the air conditioning system consists of three major components (compressor, condenser, and evaporator) which are selected to operate together in a certain relationship of temperature, pressure, and horsepower. The actual values these three items will assume depend upon the combined effect that five external variables have on the system. These are:

1. Evaporator air inlet dry bulb temperature

2. Evaporator air inlet wet bulb temperature
3. Evaporator air quantity
4. Condenser water inlet temperature
5. Condenser water quantity

Item 1 will be recognized as the most commonly used index of comfort. (To simplify this discussion it is assumed that no outside air is brought into the duct system and therefore that return air and air entering the evaporator are the same temperature). Use is made of a temperature-sensitive device, called a thermostat, to keep item 1 constant.

Item 2 in combination with item 1 is an index of relative humidity. On most air conditioning jobs, the control of relative humidity to a specific level is secondary to the control of the dry bulb temperature. Relative humidity, therefore, will fluctuate within the limits allowed by the cycling of the equipment. It should be remembered that relative humidity can rise quite rapidly when the machine is not running. This is in contrast to the dry bulb temperature which rises slowly due to the heat absorbing capacity of building and furnishings. For this reason it is not wise to oversize machines greatly,

Air Conditioning Fundamentals

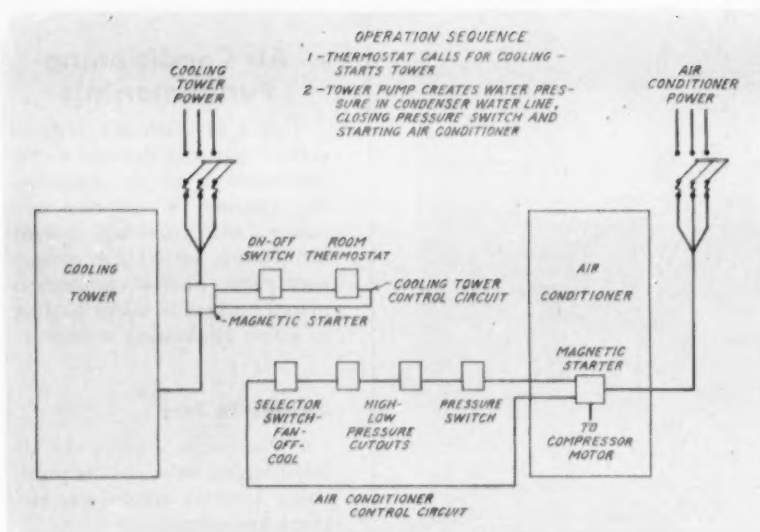
This is the 12th in a planned series of articles devoted to the fundamentals of air conditioning systems for summer and winter, and providing specific information on all the component parts. Special emphasis is placed on how to adapt cooling to warm air heating systems.

Articles So Far:

1. The terms used in the air conditioning field, i.e., air properties, comfort conditions, etc. (September issue)
2. The parts of the refrigeration system and how they work (October issue)
3. How to estimate cooling loads (November issue)
4. How to achieve proper air stream patterns in the conditioned space (December issue)
5. Duct design — comparison between sizing for summer and winter (January issue)
6. Condensing units (February issue)
7. Fans, fan motors and fan speeds (March issue)
8. Filters — throwaway, cleanable, electronic (April issue)
9. Condensers and water regulating valves (May issue)
10. Cooling towers and evaporative condensers (June issue)
11. Equipment selection (July issue)
12. Electrical control systems (this issue)

Future Articles:

1. Electric controls
2. Sample problem — estimating cooling load and selecting equipment
3. Second sample problem, using different building and conditions.
4. Trouble shooting — detecting malfunctioning of summer air conditioning equipment (two articles)
5. Replacement procedures for defective parts in cooling equipment (two articles)



4 FOR AUTOMATIC CONTROL of the cooling tower, the pump must be interlocked with the air conditioner control circuit

for short running and long off cycles may cause an uncomfortable rise in relative humidity.

On certain air conditioning jobs where control of relative humidity as well as dry bulb temperature is required, a humidity sensitive device called a humidistat is used to start and stop the cooling unit as required. To prevent the dry bulb temperature from dropping too low, a thermostat is used in conjunction with a reheat coil in the supply air stream.

Item 3 is usually set at the time the system is initially balanced. For this reason, air quantity is not an item that requires automatic control except in rare cases where static pressures switches are used to indicate the falling off of air quantity due to clogging of filters.

Items 4 and 5 affect the condensing or head pressure and corresponding temperature of the refrigerant. An automatic water regulating valve operated by head pressure is used to vary water quantity as required by changes in the inlet water temperature and the load on the unit.

Having examined the five variables which can affect the operating balance of a mechanical cooling system and having seen that only two of the five, the wet and dry bulb temperatures of the air entering the evaporator, are of particular concern

from the comfort standpoint, let us proceed to see how the desired Level of these items is translated electrically into a pattern of machine operation. We shall also see how certain electrical safety devices are built into the systems to sense the danger signs of abnormal operation.

Controlling a Small Cooling Unit

Fig. 1 represents a control scheme for a small unit with an air cooled condenser. The popular window unit is in this class. On Fig. 1 we see the basic components of a cooling system: the compressor, the condenser, and the evaporator. Since we are using an air-cooled condenser, we have shown a fan to circulate air over it and a second fan to circulate air over the evaporator.

The only operable control on this unit is the manual selector switch. As shown, this switch is in its off position. In its upward position, it allows the conditioned air fan and the compressor to operate. Usually the only safety control in this class unit is a thermal overload protector associated with the compressor motor. This device opens the compressor motor circuit in response to the combined effect of motor current and winding temperature. Electrical starting equipment for the compressor motor has been omitted from the

diagram for the sake of simplification since it varies with different makes of motors.

The wiring scheme shown can be used on any size unit up to about 1 hp for either 115 or 230 volts single phase current. The manually operated selector switch must be sized to take the rated capacity of the motors connected to it. On units where only one fan motor is used to operate both fans, the single motor would be wired into the system in place of the evaporator fan motor shown.

Automatic on-off control for this class of unit would simply mean the insertion of a thermostat having contacts of ample capacity, as shown by the dotted marking near the off-on switch. Since power companies in certain areas are objecting to the frequent on-off cycling of this type of unit, automatic capacity modulation is being accomplished by different means by some manufacturers. One make of unit is kept running continuously. The cooling effect of the unit is varied artificially in response to the demands of a thermostat which turns on and off a small heater attached to the refrigerant liquid line.

Magnetic Starting Needed

Fig. 2 is typical of a larger class of units known as self-contained air conditioners. Because of their size (3 to 15 tons or larger), these units are usually supplied for 3 phase current, although it is possible to obtain them for most currents encountered. Automatic control for this class of unit requires the use of magnetically operated starting equipment as indicated. The starters usually contain thermal overload relays which trip and stop the compressor whenever an abnormally high current passes through them for any length of time. Each combination of motor and starter calls for a specific size of thermal element. These should be checked and kept within the recommended sizes to assure adequate motor protection.

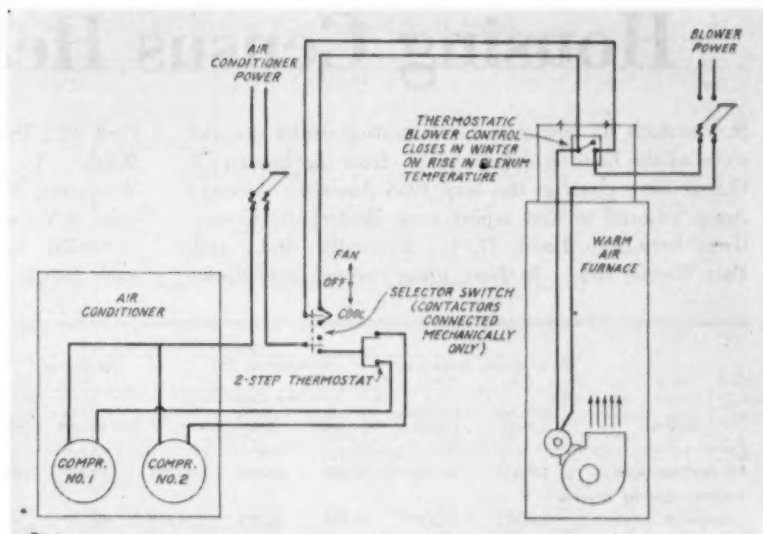
As indicated on the diagram, the three position selector switch, shown in the off position, can be moved either up for operation of the fan

only or down for operation of both the fan and compressor motors. Fan motors for units smaller than 10 tons are usually single phase and can be controlled by the selector switch directly, provided it is rated high enough. The diagram represents such units. On larger units, 3 phase fan motors are usually used requiring a separate magnetic starter, the control circuit of which can be operated by the selector switch.

Because of the relatively large currents required by units of the size controlled as in Fig. 2, it is not practical to break the compressor motor power lines directly with the thermostat as was the case on the small units which are controlled as in Fig. 1. Thermostats furnished with self-contained air conditioners are usually of the return air type. They are mounted within the units and have temperature sensitive bulbs located in the path of the air returning to the unit. The contacts in the thermostat make and interrupt current to the magnetic motor starter operating coil. When the coil is energized, the starter contacts close, starting the compressor motor. The fan must operate continuously to bring room air to the thermostat bulb.

In the same circuit to the starter coil are four other sets of contacts in addition to the thermostat contacts. Two sets of contacts are in the thermal overload relays (in a 3 phase starter there are two overload relays) mentioned above. The other two sets are in the high and low pressure cutouts. These devices are subject to the high and low pressures, respectively, in the cooling system. Should condenser water be shut off causing abnormally high head pressure or should an evaporator fan belt break or some other accident remove the load from the evaporator, causing an abnormally low pressure, the cutouts will trip and stop the compressor.

With the larger sizes of self-contained units it is frequently desirable to use remotely located, wall mounted thermostats. This can be done in two ways, one using line voltage, and the other using low voltage. Where a line voltage, wall mounted thermo-



5 WHERE A COOLING UNIT is added to a warm air furnace, it is necessary to tie the heating fan into the control circuit for the cooling unit

stat is used, it is simply a matter of substituting a properly selected instrument of this type for the return air thermostat shown and extending the control lines to the point on the wall where the thermostat is mounted. Since the lines carry full voltage it is necessary that they comply with all applicable codes.

When a low voltage, wall mounted thermostat is used, it is necessary to introduce a relay into the circuit in place of the return air thermostat shown. The relay coil is then energized through the low voltage thermostat which obtains current from a small transformer. Because they do not have to be built as ruggedly, low voltage thermostats can be produced with more sensitivity than can line voltage thermostats.

System Controls Two Factors

Fig. 3 shows a more complex type of cooling system of a relatively large size designed to control both temperature and humidity. It contains all the components and controls shown on Fig. 2, plus several additional ones. Because of its size this type of system is usually put together in the field, as compared with the factory-assembled systems shown in Figs. 1 and 2.

Whenever humidity is to be held to a certain level it takes precedence

over dry bulb temperature in controlling compressor operation. We could introduce the humidistat contacts into the compressor starter coil circuit just as we did with the thermostat in Fig. 2. However, with the larger, field assembled units, it is desirable to have the compressor remove all refrigerant from the cooling coil when it shuts down so that no liquid will remain to "slug" back to the compressor when it starts up. We accomplish this by allowing the humidistat to close a solenoid valve in the liquid line whenever humidity is satisfied. Once the valve has closed, no more liquid can enter the coil to evaporate. The compressor continues to run, removing the refrigerant remaining in the coil. As this takes place, the suction pressure drops until the low pressure cutout trips, breaking the starter holding coil circuit and stopping the compressor.

Since the compressor will run until the humidistat is satisfied, regardless of the dry bulb temperature, it is quite possible for this temperature to get too low. In order to prevent this, a second coil known as a reheat coil, is introduced into the air stream. A modulating type thermostat connected to a modulating steam valve will admit steam to the coil as re-

(Please turn to page 136)

Housing Census Heating Data

SUGGESTIONS ON how a warm air heating dealer can use some of the housing data available from the Bureau of Census were given in the May 1953 American Artisan. Areas covered in that report were Bridgeport, Conn.; Greensboro-High Point, N. C.; Evansville, Ind.; and Fort Wayne, Ind. In June, areas covered were Rock-

ford, Ill.; Fall River, Mass.; Reading, Pa.; and Seattle, Wash. In July, Los Angeles, Calif.; Savannah, Ga.; Worcester, Mass.; Minneapolis-St. Paul, Minn.; Syracuse, N.Y.; and Dallas, Tex., were reported.

Similar figures for other areas will be appearing each month.

Subject	Standard Metropolitan Areas										
	Birmingham, Ala.	Sacramento, Calif.	Wilmington, Del.		Des Moines, Ia.		Detroit, Mich.			Fort Worth, Tex.	
	Jefferson County	Sacramento County	The area	New Castle County, Del.	Salem County, N. J.	Polk County	The area	Macomb County	Oakland County	Wayne County	Tarrant County
All dwelling units	159,377	87,253	78,483	62,901	15,582	72,099	858,027	52,306	120,096	685,625	114,615
Number reporting heating equipment	151,875	81,130	74,645	60,295	14,350	69,140	819,325	48,935	107,835	662,555	106,875
Central heating	59,015	40,590	57,180	48,915	8,265	53,080	648,605	28,165	77,465	542,975	17,250
Coal	18,840	195	22,415	19,505	2,910	28,990	362,090	16,060	40,600	305,430	295
Wood	95	225	285	225	60	245	1,475	95	520	860	170
Utility gas	18,100	37,675	4,450	4,325	125	15,415	184,650	3,500	9,375	171,775	15,795
Bottled gas	450	830	255	250	5	305	1,385	45	115	1,225	595
Liquid fuel	1,065	750	28,565	23,660	4,905	7,520	86,725	7,465	25,320	53,940	105
Other fuel	315	815	880	650	230	405	8,635	905	1,265	6,465	140
Not reported	170	100	330	300	30	200	3,645	95	270	3,280	150

Types of Nonfarm Dwelling Units, by Type of Heating and Year Built

Subject	Total occupied						Owner occupied			Renter occupied					
	Total	1 dwelling unit, detached	Other 1, and 2 dwelling unit	3 and 4 dwelling unit	5 to 9 dwelling unit	10 dwelling unit or more	Total	1 dwelling unit, detached	All other dwelling units	Total	1 dwelling unit, detached	Other 1, and 2 dwelling unit	3 and 4 dwelling unit	5 to 9 dwelling unit	10 dwelling unit or more

Standard Metropolitan Area of Birmingham, Ala.—Jefferson County

All occupied units	147,120	91,710	35,835	9,155	5,390	5,030	73,855	65,180	8,675	75,265	26,530	28,595	8,020	5,135	4,985
HEATING EQUIPMENT															
Central heating	36,995	23,192	3,967	3,438	2,507	3,891	23,801	21,333	2,468	13,194	1,859	2,233	2,891	2,343	3,868
Piped steam or hot water	11,084	4,272	852	1,234	1,551	3,375	4,172	3,721	451	6,912	551	641	1,072	1,296	3,352
Warm air furnace	25,911	18,920	3,115	2,204	1,156	516	19,629	17,612	2,017	6,282	1,308	1,592	1,819	1,047	516
Noncentral heating, with flue	86,362	55,412	24,858	3,412	1,905	775	38,205	34,321	3,884	48,157	21,091	21,297	3,148	1,869	752
Nonctrl. htng., without flue; or not ltd.	22,204	12,112	6,672	2,146	952	322	10,994	8,784	2,210	11,210	3,328	4,821	1,842	897	322
Not reported	1,566	1,001	337	160	25	43	863	749	114	703	252	243	140	25	43
YEAR BUILT															
1945 or later	23,579	18,057	1,545	1,848	1,346	783	15,657	15,145	512	7,922	2,912	1,059	1,848	1,320	783
1940 to 1944	10,415	6,796	1,275	336	1,080	928	5,637	5,475	162	4,778	1,321	1,113	336	1,080	928
1939 or earlier	110,368	65,650	32,145	6,679	2,797	3,117	51,740	43,818	7,922	58,628	21,812	25,607	5,570	2,567	3,072
Not reported	2,750	1,220	869	290	168	203	815	735	80	1,935	485	815	264	168	203

Standard Metropolitan Area of Sacramento, Calif.—Sacramento County

All occupied units	77,705	57,230	8,060	5,505	3,405	3,505	49,305	45,925	3,380	28,400	11,305	5,745	4,710	3,205	3,435
HEATING EQUIPMENT															
Central heating	59,666	29,483	3,578	2,748	1,476	2,381	28,000	26,144	1,856	11,666	3,339	2,289	2,366	1,361	2,311
Piped steam or hot water	4,169	1,591	260	384	380	1,554	1,634	1,304	330	2,535	287	117	296	351	1,484
Warm air furnace	35,497	27,892	3,318	2,364	1,096	827	26,366	24,840	1,526	9,131	3,052	2,172	2,070	1,010	827
Noncentral heating, with flue	31,533	22,833	3,615	2,507	1,666	912	17,618	16,320	1,298	13,915	6,513	2,756	2,154	1,580	912
Nonctrl. htng., without flue; or not ltd.	5,136	3,951	702	177	220	106	2,867	2,743	124	2,289	1,208	607	148	220	106
Not reported	1,351	965	165	71	44	106	820	719	101	531	246	93	42	44	106
YEAR BUILT															
1945 or later	22,793	19,582	1,672	415	350	774	17,466	16,946	520	5,327	2,636	1,209	358	350	774
1940 to 1944	9,098	7,960	593	303	242	...	7,067	6,900	167	2,031	1,060	454	275	242	...
1939 or earlier	43,617	28,157	5,646	4,592	2,649	2,573	24,002	21,390	2,612	19,615	6,767	3,956	3,911	2,478	2,503
Not reported	2,197	1,532	149	193	164	159	770	690	80	1,427	842	126	165	135	159

Types of Nonfarm Dwelling Units, by Type of Heating and Year Built

Subject	Total occupied						Owner occupied			Renter occupied					
	Total	1 dwelling unit, detached	Other 1, and 2 dwelling unit	3 and 4 dwelling unit	5 to 9 dwelling unit	10 dwelling unit or more	Total	1 dwelling unit, detached	All other dwelling units	Total	1 dwelling unit, detached	Other 1, and 2 dwelling unit	3 and 4 dwelling unit	5 to 9 dwelling unit	10 dwelling unit or more

Standard Metropolitan Area of Wilmington, Del.—New Castle County, Del., and Salem County, N.J.

All occupied units	69,850	28,148	31,950	5,630	2,655	1,470	39,220	21,485	17,735	30,630	6,660	15,045	4,990	2,560	1,375
HEATING EQUIPMENT															
Central heating	52,474	20,975	23,492	4,375	2,251	1,380	33,470	18,043	15,427	19,003	2,932	8,780	5,835	2,156	1,300
Piped steam or hot water	28,698	10,032	12,342	3,343	1,733	1,248	16,856	8,555	8,301	11,842	1,477	4,500	3,003	1,662	1,200
Warm air furnace	23,775	10,943	11,150	1,032	518	132	16,614	9,488	7,126	7,161	1,455	4,280	832	494	100
Noncentral heating, with flue	13,978	6,181	6,610	825	337	25	4,576	3,044	1,532	9,402	3,137	5,118	785	337	25
Nonctrl. htng., without flue; or not htd.	2,485	699	1,379	274	67	66	732	244	488	1,753	455	927	254	67	50
Not reported	918	292	470	156	445	156	289	473	136	221	116
YEAR BUILT															
1945 or later	7,298	5,768	898	368	264	...	5,385	4,939	446	1,913	829	452	568	264	...
1940 to 1944	7,216	3,694	2,835	227	264	196	4,869	3,320	1,549	2,347	374	1,329	184	264	196
1939 or earlier	53,869	18,062	27,731	4,889	1,942	1,245	28,405	12,820	15,585	25,464	5,242	12,891	4,334	1,847	1,150
Not reported	1,464	619	484	148	185	28	560	405	155	904	214	372	105	185	28

Standard Metropolitan Area of Des Moines, Ia.—Polk County

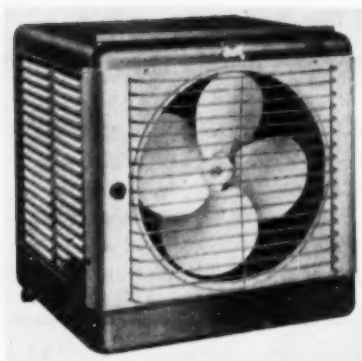
All occupied units	67,220	47,120	5,990	5,025	5,730	3,355	44,950	40,850	4,100	22,270	6,270	3,510	3,950	5,260	3,280
HEATING EQUIPMENT															
Central heating	51,602	33,860	4,919	4,507	5,248	3,068	34,384	30,759	3,625	17,218	3,101	2,882	3,432	4,778	3,025
Piped steam or hot water	9,916	2,473	869	1,157	2,753	2,664	2,740	1,952	788	7,176	521	581	846	2,596	2,632
Warm air furnace	41,686	31,387	4,050	3,350	2,495	404	31,644	28,807	2,837	10,042	2,580	2,301	2,586	2,182	393
Noncentral heating, with flue	13,001	11,377	913	353	299	59	8,902	8,570	332	4,099	2,807	581	353	299	59
Nonctrl. htng., without flue; or not htd.	1,196	944	68	141	23	20	785	763	22	411	181	46	141	23	20
Not reported	1,427	944	89	24	161	209	884	763	121	543	181	...	24	161	177
YEAR BUILT															
1945 or later	6,834	6,210	370	175	53	26	5,692	5,571	121	1,142	639	249	175	53	26
1940 to 1944	3,841	2,942	88	50	579	182	2,742	2,682	60	1,099	260	28	50	579	182
1939 or earlier	54,788	37,156	5,391	4,568	4,784	2,889	35,727	31,998	3,729	19,061	5,158	3,123	3,525	4,366	2,889
Not reported	1,757	812	141	232	315	257	788	599	189	969	213	111	200	263	182

Standard Metropolitan Area of Detroit, Mich.—Macomb, Oakland and Wayne Counties

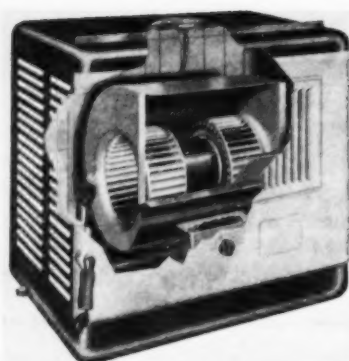
All occupied units	797,370	466,375	175,305	57,370	27,380	70,740	488,270	409,630	78,640	309,100	56,745	107,560	49,140	25,860	69,795
HEATING EQUIPMENT															
Central heating	623,136	359,496	134,949	38,206	23,057	67,428	387,893	324,399	63,494	235,245	35,097	79,879	32,028	21,559	66,680
Piped steam or hot water	219,004	75,352	47,243	17,938	16,393	62,078	87,986	64,173	23,813	131,018	11,179	28,036	14,741	15,450	61,612
Warm air furnace	404,132	284,144	87,706	20,268	6,664	5,350	299,907	260,226	39,681	104,225	23,918	51,843	17,287	6,109	5,068
Noncentral heating, with flue	144,777	92,305	32,541	15,825	2,995	1,111	86,199	74,258	11,941	58,578	18,047	22,353	14,183	2,921	1,074
Nonctrl. htng., without flue; or not htd.	17,415	8,477	5,029	2,252	773	884	8,103	6,484	1,619	9,312	1,993	3,580	2,144	736	859
Not reported	12,038	6,097	2,783	1,084	758	1,316	6,080	4,494	1,586	5,958	1,603	1,745	782	647	1,181
YEAR BUILT															
1945 or later	95,167	85,543	4,757	1,069	956	2,842	83,471	81,516	1,955	11,696	4,027	2,956	987	920	2,806
1940 to 1944	99,863	85,978	8,494	4,326	1,551	1,514	82,180	78,709	3,471	17,683	5,269	5,187	4,162	1,551	1,514
1939 or earlier	576,680	287,661	156,678	49,599	23,810	58,932	314,764	243,387	71,377	261,916	44,274	95,326	41,914	22,335	58,169
Not reported	25,661	9,191	5,375	2,381	1,264	7,450	7,862	6,019	1,843	17,799	3,172	4,085	2,081	1,156	7,305

Standard Metropolitan Area of Fort Worth, Tex.—Tarrant County

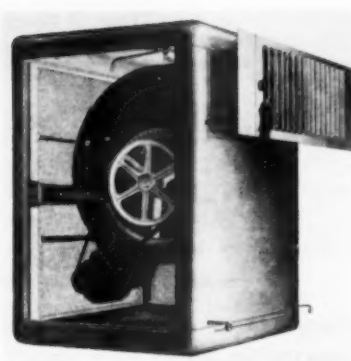
All occupied units	103,355	73,680	17,005	7,600	3,465	1,605	62,510	56,085	6,425	40,845	17,595	11,820	6,650	3,240	1,540
HEATING EQUIPMENT															
Central heating	17,422	13,090	2,266	711	617	738	12,397	11,543	852	5,025	1,545	1,576	610	567	727
Piped steam or hot water	5,565	3,397	1,121	377	295	373	3,155	2,738	417	2,410	659	765	327	295	364
Warm air furnace	11,857	9,693	1,145	334	322	365	9,242	8,807	435	2,615	886	811	283	272	363
Noncentral heating, with flue	13,661	11,871	2,178	916	546	150	9,343	8,698	645	6,318	3,173	1,711	763	521	150
Nonctrl. htng., without flue; or not htd.	68,058	47,133	12,203	5,825	2,257	642	39,449	34,727	4,722	28,609	12,404	8,353	5,146	2,107	599
Not reported	2,215	1,589	358	148	45	75	1,322	1,116	206	893	473	180	131	45	64
YEAR BUILT															
1945 or later	25,616	22,687	2,123	338	134	334	19,628	18,973	655	5,988	3,714	1,468	338	134	334
1940 to 1944	13,568	9,578	1,196	2,200	363	231	8,021	7,762	259	5,547	1,816	995	2,170	335	231
1939 or earlier	61,731	39,714	13,186	4,947	2,895	989	33,471	28,245	5,226	28,260	11,469	9,083	4,058	2,726	924
Not reported	2,440	1,701	500	115	75	51	1,390	1,105	285	1,050	596	274	84	45	51



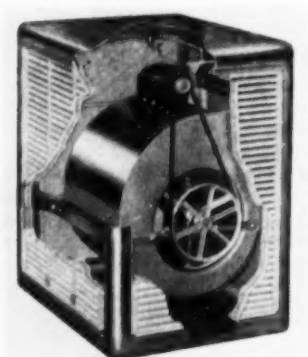
1 FOR COOLING one or two rooms . . .



2 FOR USE WHERE permanent water connections are not feasible . . .



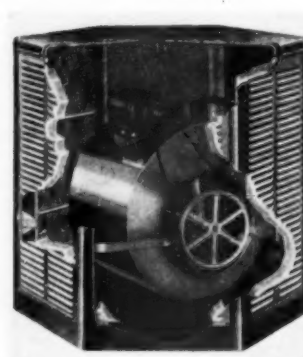
3 FOR WINDOW MOUNTING plus outside view . . .



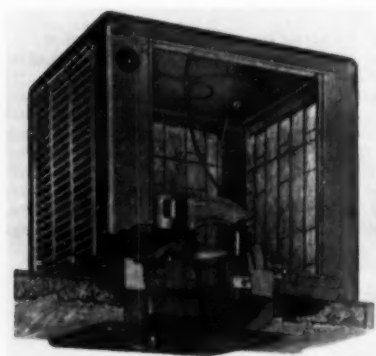
4 FOR USE where outside platforms are provided . . .



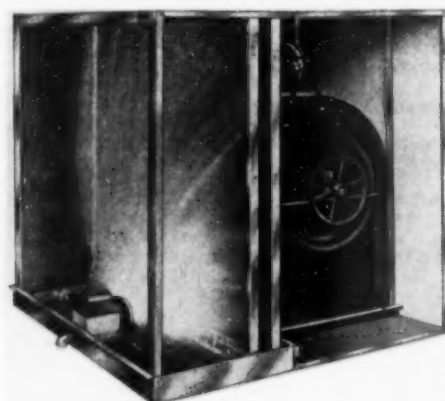
5 FOR ROOF mounting . . .



6 FOR EXTRA pad area in any given size . . .



7 FOR TRAILER cooling . . .



8 FOR AVOIDING water entrainment in high capacity cooling . . .

for many uses . . .

Many Types of Evaporative Coolers

Robert S. Ash
Professional Engineer

EVAPORATIVE COOLERS are made in three types: pad, rotary, and spray. In addition to the evaporative cooler there is the commercial air washer which may be used for evaporative cooling. All of these units are generally used for directly cooling the air through the evaporation of water. This reduces the dry bulb temperature and raises the relative humidity, as shown in the first article of this series, *How Evaporative Cooling Works* (July American Artisan). The coolers may also be used indirectly (in conjunction with a heat exchanger).

The pad type cooler consists of a housing with three or more sides made up of evaporative pads and a propeller fan or centrifugal blower. The pads, usually composed of excelsior which is distributed loosely between wire mesh screens or bound by cheese cloth, are saturated with water from perforated distributing troughs or pipes. Excess water not evaporated before reaching the bottom of the pads is collected and removed through a drain opening in the bottom of the housing. A small centrifugal pump may be used to conserve water by returning it to the trough. The fan or blower draws air through the pads where it is cooled by the evaporation of the water, and it delivers the air through an opening in the housing to the area to be cooled.

Fig. 1 shows a typical fan type cooler with a capacity of approximately 1500 cfm. Coolers of this type are used to cool one or two rooms and are usually installed in a double hung window. The cooler is provided with a wire safety guard and grille over the outlet in which the fan is located. Mounted on the face of the cooler are a needle valve for regulating the flow of water to the troughs or pipes and an electric switch for starting and stopping the fan. These coolers usually are provided with an extension cord for connection to a convenient outlet in the room. Many also are furnished with adjustable side panels to block off the opening of the window on either side.

Some Blower Coolers Are Window-Mounted

Another type of window cooler — one using direct drive blowers instead of a propeller fan — is shown in Fig. 2. Blower type coolers are intended to deliver the air at a higher velocity than that normally found in propeller type units, but not necessarily in greater capacities. This model, small enough for convenient handling, is fitted with a recirculating pump and has a deep bottom so that it may be manually filled with water through the access opening on the right hand side of the front of the cooler. (Fig. 2 shows the access cover in closed position). These coolers are especially suitable for installations where it is inconvenient or impractical to make a permanent water connection. The bottom pan or water reservoir holds approximately six gallons of

water, which will usually permit running the cooler four hours or more between fillings. Coolers of this type are also made with propeller fans but have a deeper bottom than the propeller type units previously described.

Coolers with more than 1500 cfm capacity are usually of the blower type and are installed on the roof of the house or on the side of the house, with ductwork and one or more outlets in the area to be cooled. However, in existing homes it is not always practical to make such an installation.

Fig. 3 shows a blower type cooler designed for window installation where the application would make it inadvisable to consider a duct installation. The cooler is provided with a duct extension and grille so that it may be mounted in the bottom sash of a double hung window. Coolers of this type are made in sizes ranging from 2500 cfm through 4500 cfm, and will cool from three to six rooms. You will note that the outlet is at the top so that the cooler can be mounted below the window sill level to provide an unobstructed view through the window.

Fig. 4 shows a cutaway view of a typical blower type cooler. Mounted on an outside platform, it discharges through any convenient wall opening. The blower is mounted above the bottom pan to reduce the possibility of corrosion of the blower frame and to provide unobstructed access to the bottom for cleaning of dirt and minerals deposited from the water. These coolers are provided with a water distributing meter (shown at the top of the cooler) to give equal water flow to each trough. The excelsior pads below the troughs are in easily removed pad frames and are supported to prevent the excelsior from sagging after having been wet. The centrifugal fan is a forward curve multivane top horizontal blower. Coolers of this type are made in sizes of 1800 cfm through 10,000 cfm.

A Cooler on the Roof

In recent years many houses have been built with evaporative cooling included as original equipment. Since these installations are usually made with the cooler on the roof, a bottom discharge cooler is desirable. Fig. 5 shows such a cooler which is essentially the same as

WHY'S AND HOW'S OF EVAPORATIVE COOLING

This is the second in a series covering evaporative cooling.

ARTICLES SO FAR:

- ▶ How evaporative cooling works (July issue)
- ▶ Types of coolers (this issue)

ARTICLES TO COME:

- ▶ Cooler design and construction
- ▶ Sizing the cooler
- ▶ Design of cooler installations
- ▶ The cooler industry and its sales

that in Fig. 4 except that a bottom discharge blower wheel is used. This arrangement eliminates the need for a 90 deg elbow and duct from the cooler outlet to the roof line, thus reducing installation cost and making a neater looking installation. The flat metal extension just below the blower inlet is a splash plate to prevent the blower from throwing water droplets.

Fig. 6 illustrates a horizontal discharge blower cooler with six sides. This cooler has more pad area for a given size than the conventional four sided cooler and has been found to be exceptionally efficient.

With the increasing use of trailers as permanent homes, coolers have been developed for trailer installations. A typical trailer cooler is shown in Fig. 7. This cooler is designed to fit over the roof hatch of the trailer and includes a ceiling directional grille and built-in pump to conserve water. Trailer coolers are also made with a bottom discharge blower in place of the propeller fan. The capacity of a trailer cooler is approximately 1500 cfm.

Pad type coolers have an efficiency of 80 per cent or higher and are used for residential, commercial, and industrial comfort cooling. They range in size from the small one room fan cooler, with a capacity of 750 cfm, to the large industrial cooler, with capacities up to 20,000 cfm, equipped with blowers up to 30 in. in diameter.

Rotary Cooler Avoids Moisture Entrainment

The rotary type evaporative cooler is essentially a cabinet housing a centrifugal fan or blower, filters, and a revolving rotor wetted through the immersion of its lower portion in a water tank (Fig. 8). The filters are usually the impingement, washable, metal type, the media consisting of crimped zinc electroplated screen which (when clean) has a resistance to air flow of about 0.1 in. static pressure.

The cylindrical rotor is 8 in. thick and consists of alternate layers of helically corrugated and flat bronze screen wound on a brass drum and driven by a gear motor at a speed of 1½ rpm. Rotary coolers are commercially made in sizes ranging from 2500 cfm through 6000 cfm.

The rotor exposes a wetted surface in the air flow, maintaining a constant cooling effect with an efficiency of 80 per cent or higher. The water that is exposed to the air is in the form of a film held on the screen. Excess water drains into the unconditioned air side of the cooler as the rotor revolves. This method of evaporating from a film of water is designed to eliminate the possibility of moisture entrainment. These coolers are intended to give a consistently uniform performance with low operating and maintenance cost.

Spray Cooler Pre-Washes Air

The spray type evaporative cooler consists of a cabinet housing a pad and a fan or blower. The pad is wetted by a film of water centrifugally distributed from a point in front of the center of the pad, and the centrifugal fan

or blower draws the air through the unit. Some spray type coolers use a "slinger" instead of a centrifugal spray unit — a slinger being a high speed paddle wheel mounted in the sump, below and in front of the pads, and driven by a separate fractional horsepower motor.

In this type of cooler, the blower pulls in air that is washed by the atomized water curtain produced by the slinger or centrifugal spray. The air then passes through the filter pad, usually made of spun glass or aspen wood, which may be in a V shape arrangement to increase pad area. The spray impinges against the pad to drench it with water and thereby wash it of dust and dirt not removed from the air by the water curtain. Usually located between the wetted pad and the blower is a second set of pads that acts as a baffle to remove entrained moisture which drains from the pad into the sump or water tank.

The spray type cooler is designed to give a constant delivery of saturated air (through the pre-washing) that should prevent clogging of the pads. Coolers of this type have an efficiency of 90 per cent or higher, and are commercially made in sizes ranging from 3500 cfm to over 12,000 cfm.

How Commercial Air Washer Cools

The commercial air washer uses the same principle of water atomization as the spray type evaporative cooler. The air washer, which does not include the centrifugal fan or blower, has been used for over 50 years to cool, dehumidify and humidify, clean and purify air. Essentially, an air washer consists of a chamber or casing enclosing a system of water sprays, a tank for collecting the water falling from the sprays, inlet louvers where the air enters the face of the washer, and moisture eliminators at the end from which the air leaves.

Air is drawn through the casing by means of a fan to bring it into contact with the water. Intimate contact between the air and the water is secured by breaking the water into fine drops through the use of centrifugal spray nozzles, by passing the air over surfaces continuously wetted by flooding nozzles, or by a combination of the two. The inlet louvers aid in producing a uniform flow of air into the washer so as to secure the full benefit of the sprays. (They also prevent any back lash from the sprays). If elbows or any abrupt changes in the ductwork occur near the inlet, guide vanes or other means usually are employed to assure a uniform, straight flow of air into the washer. The eliminators remove drops of moisture entrained in the air leaving the sprays to avoid water carry-over into the air distribution system.

The length of air washers varies considerably. A space of approximately 2½ to 5 ft between spray banks is used and the first and last banks of sprays are located about 1 to 2 ft from the entering or leaving end of the washer. Air washers of nearly equal height and width are desirable from an air flow standpoint. While either one or two spray banks may be used, the second spray bank, which continuously wets the eliminators, adds additional area of water surface for contact with the air, increasing the air washer efficiency.

An adequate amount of spray water broken up into fine droplets throughout the air stream can usually be attained with a pressure of 25 psi. Under normal conditions, an air velocity of 500 fpm through the air washer will provide good operation. While the washers will operate satisfactorily at higher velocities, they will be less efficient and have a higher air friction. The resistance to air flow varies from as low as $\frac{1}{4}$ in. to more than $\frac{1}{2}$ in. static pressure.

Evaporative cooling efficiency or the percentage of reduction in the dry bulb temperature to the wet bulb temperature will range between 60 and 85 per cent for a well designed air washer. Much depends upon the type of eliminators and wetted surfaces, the number of banks of sprays, and their direction and air velocity. Air washers are commercially made in sizes to handle from 5000 to over 100,000 cfm.

Cell Banks Offer High Cooling Efficiency

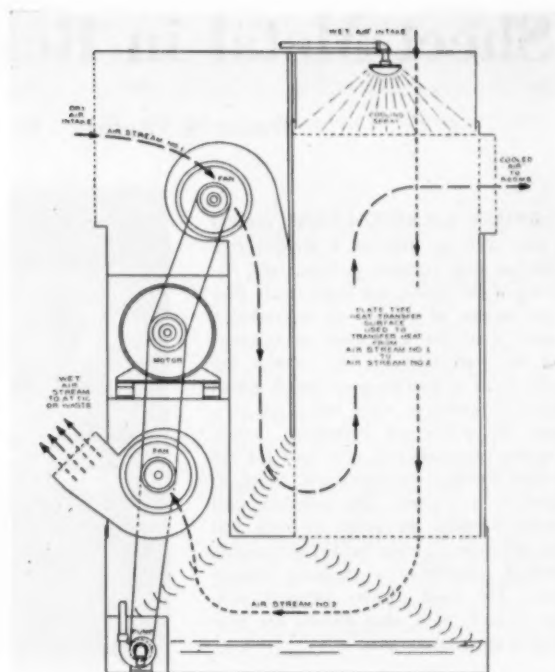
A rather recent development in air washer design is the capillary air washer, in which the sprays are located on either the air entering side or air leaving side of inclined cell or filter banks. These banks are composed of unit cells similar in size and appearance to a conventional filter for warm air heating.

One manufacturer of this type of air washer uses a capillary cell consisting of a metal frame 20 x 20 x 8½ in. in size, with coarse and fine wire screen faces housing approximately 5700 glass fibers. The fibers are 9 in. long, with 0.011 in. diameters, and give an effective glass contact area of 125 sq ft per cell. The glass filaments are held in place through a cross-mat of glass fibers on each cell face and act as a water distributing mechanism by carrying the water along the face and feeding it uniformly to the main filling. The cells are designed for a maximum air volume of 1100 cfm and for a maximum water quantity of 9 gpm per cell.

The air resistance of a capillary air washer varies approximately as the square of the cfm per cell and increases with increased water quantity. Actual air resistance may vary from less than $\frac{1}{2}$ in. static pressure to over $\frac{3}{4}$ in. static pressure. The evaporative cooling efficiency is exceptionally high, running from 95 to 99 per cent, depending upon the air flow through the cells.

Indirect Cooling — No Rise in Humidity

As we have noted previously, an evaporative cooler or air washer reduces the dry bulb temperature through the vaporization of water, with a resultant increase in relative humidity. This is known as direct evaporative cooling. If the cooled air from the cooler or air washer is used to chill room air through the use of a heat exchanger, we are able to effect a reduction in the room air temperature of three-fourths or more of the drop in temperature realized by the cooler, with no increase in the moisture content of the air. Since the cooler may drop the dry bulb temperature as much as 30 F, the transferred effect in the room air stream may be 22 to



9 WITH THIS indirect evaporative cooling unit, rooms supplied by air stream No. 1 receive the cooling effect of washed air stream No. 2 without a rise in relative humidity

25 F below outside air temperature. The waste, moisture laden air stream can be vented to the attic to aid in reducing solar heat gain. This process is known as indirect evaporative cooling.

Fig. 9 shows the component parts which may be included in such a special evaporative air cooling unit to achieve indirect cooling of the room air by transferred effect. The apparatus includes one motor to drive two fans, one of which moves the air to and from the rooms, while the other draws a separate air stream through the air washer. Both streams move through a plate type heat transfer surface in which the warm air of the rooms transfers its heat to the cooler air stream of the air washer. The two streams cannot mix, for the heat transfer surface is arranged in narrow, parallel ducts.

Combination Cooling Possible

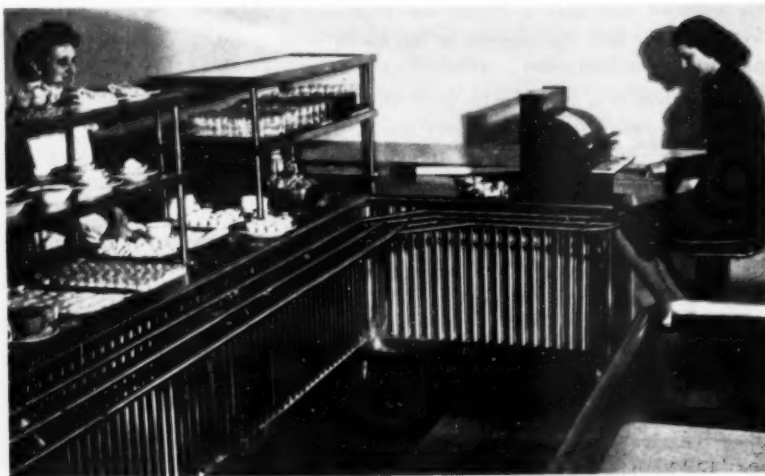
Indirect evaporative cooling may also be combined with direct evaporative cooling through the use of an evaporative condenser and pre-cooling coils to form a two stage cooling unit. The coils are chilled by the circulation of water that is cooled to approximately the wet bulb temperature in the condenser. These coils dry cool the air, lowering the dry and wet bulb temperature. The air is then passed through the evaporative cooler where it is further cooled.

[Figs. 1 through 6 are courtesy International Metal Products Co., Fig. 7 is courtesy Montgomery Ward and Co.; Fig. 8, courtesy Alton Mfg. Co.; and Fig. 9 is from Bulletin 589, Experiment Station, University of California.]

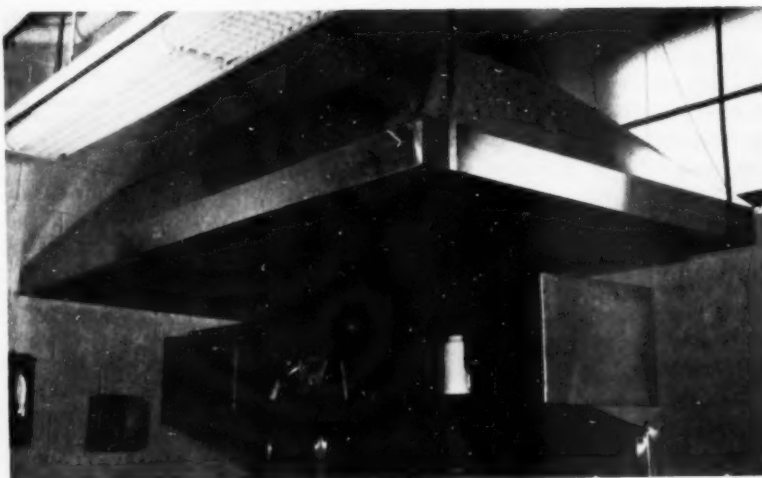
Sheet Metal in Restaurants and Stores

Ernest E. Zideck, Sheet Metal Consulting Engineer

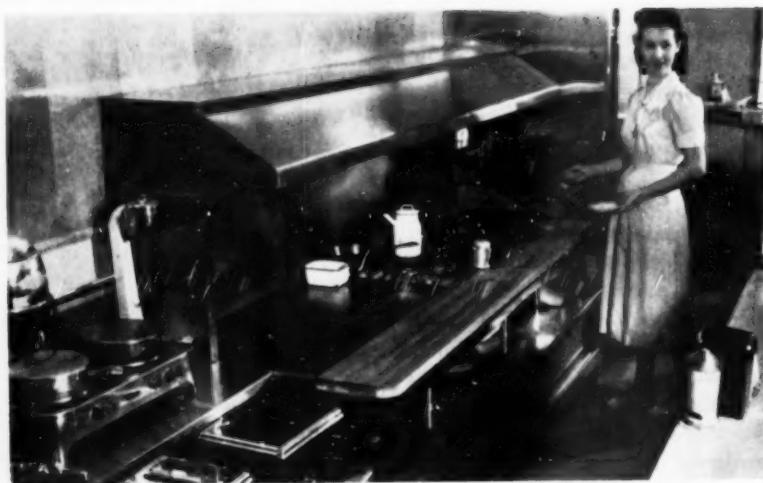
CORRUGATED RESTAURANT counter fronts, such as this, of a welded construction that requires grinding and finishing of the welds, are more costly than constructions of seamed or overlapping panels used for the sides of counters and for wall linings. The counter top itself is of a heavier gage metal which does not buckle or wave under the pressures of dishes or customers' hands. Heavier gage metal is also used for the bottom holding the corrugated front, to which it is welded. The stainless steel tubing forming the series of rails and tray upholders is also welded and highly finished, presenting a pleasing appearance. The food display cabinets atop the counter, with glass fronts, are now used in most restaurants.



THE FUME COLLECTING hood over this cooking equipment in the kitchen of a Kentucky grade school is of a standard construction. Noteworthy is its connection to the exhaust duct as is also the stainless steel food warmer above the cooking range. The walls also are steel lined. In most of these installations the fabricator is guided by the physical factors of the building and the room, to which he must suit his plan of construction and installation. This eliminates installations of factory-made, standardized units, and opens a wide field of lucrative work to the local or neighborhood sheet metal shop. There is room for individual taste in choosing ornamentation and in the design and fabrication of build-up detail.



THIS QUICK LUNCH and fry station shows standardization, and is one of many fabricated for sale to restaurants. Its size allows it to be transported and placed suitably in almost any eating place. Its several accessories are quantity production items and are accordingly highly finished for an attractive appearance. The wall lining behind the frying equipment is steel and so is the counter top at the right. Where such standardized units are installed, there usually is work to do for the local sheet metal shop in connecting the hood to the exhaust and in paneling the walls.



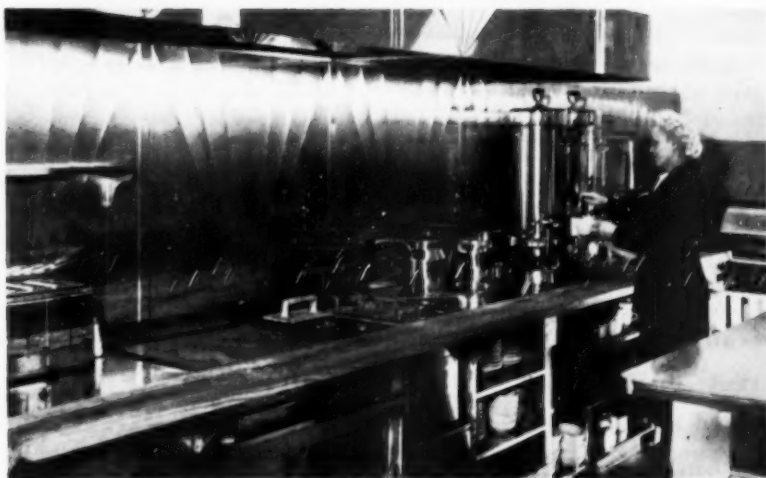
The installations shown have been selected by the author to illustrate various features of restaurant and kitchen sheet metal work which he has discussed in a series of articles, of which this is the last. Many shops are adequately tooled and manned to fabricate similar fixtures for use locally. Smaller shops can find lucrative work in wall and counter coverings and fume exhausts, which do not require the finishing off and polishing of exposed welding



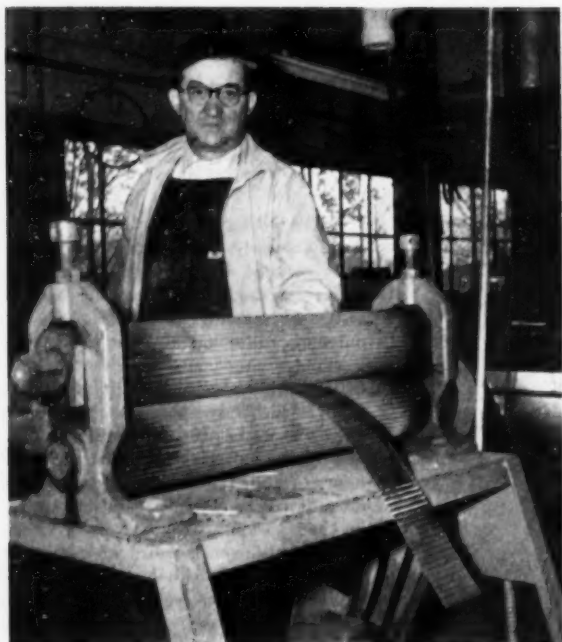
IN STAINLESS STEEL fixtures fabricated expressly for supermarkets, several units may be interconnected, as shown. However, single units may be had as well. The fixtures are fabricated not only for utility but also for looks. Accordingly, the equipment shows high craftsmanship applied to build-ups. Local shops which may secure orders from neighborhood stores for similar build-ups, or for covering the existing wood fixtures with stainless steel, not infrequently will be able to secure wall covering and various trimming jobs as well. Once a customer has had one stainless steel item installed, the difference in looks and easy upkeep of the steel will move him to have additional stainless work done.



THIS STANDARDIZED EQUIPMENT is shown as it would appear when installed for use in a restaurant, with fume exhaust connections and wall coverings left to the installer to complete. While the local shop cannot compete with the maker of this equipment in getting out the highly finished fixtures and accessories, the distant fabricator cannot compete with the local contractor in doing the job of fume exhaust and wall coverings or fabricating other items which will complement the installation. The counter has the appearance of solid steel, and this is characteristic of the other fixtures as well. Heavier gage metal must be used in the fabrication. Welding and finishing lend the units their solidity.



"FLUTED" PANELS, as used in this installation, can be made rigid even if lighter gage metal is used. The formation deflects the light reflections thrown by the highly polished surfaces of the steel. Tastes differ, but the counter at the right, having the look of solid steel, may seem to many more expensive than the fluted panel construction at left. The public taste has been educated for "streamlining", and most people prefer straight lines in metallic constructions. [Photographs through courtesy of Armco Steel Corp.]



1 OLD TIME crimping machine is still useful for stiffening copper strips for flashings



2 NEW WAY to handle canvas roll for duct connections speeds shop fabrication techniques



3 CENTURIES OF EXPERIENCE and tradition are combined to produce installations such as this tin roof, by

318 Year Old Roofers

By virtue of ancient ancestry, the roofing crown of America rests on the brow of George II of the House of Ballard of Rochester, and in direct lineal descent to his son, George III

Lawrence E. Gichner Sheet Metal Contractor

FOR 318 YEARS, George Ballard's forebears have been roofers, like himself and his son. Proof of their claim to the throne is found in a coat of arms, which the Ballards possess, in the form of a walnut panel with rampant lion. This coat of arms is of the Keeper of the Roofs of the Royal Castles.

The Ballards originally moved to England with William the Conqueror. For generation after generation they installed straw thatched roofs that lasted decades and reed roofs, known as Norfolk rush, which were good for half a century. In valleys they used rye and barrel straw because it swells fast when it gets wet.

"When a tile roof was called for, we would set a beehive kiln up on the site and make the tiles right there in the size and shape required," Mr. Ballard reports. For repair jobs, they did the same thing — set up a kiln and duplicated tiles for those that were broken and missing. "In the old days we also bought slate by the thousands, not by the square as we do now," he said.

Mr. Ballard started at 12 to learn his trade in England. He came to America at 15 and began by earning \$1.25 a week on his first job. Thirty-two years ago he founded Ballard, Inc., which has grown steadily in size and volume. The payroll has gradually been expanded until now it includes over 40 mechanics.

Shop Streamlined for Efficiency

The plant is a combination shop and yard arrangement with Mr. Ballard's office so located and constructed that by sitting at his desk and turning around he commands a

view in four directions and can see what is happening out in his roofing yard, his sheet metal shop, his book-keeping office and his loading areas.

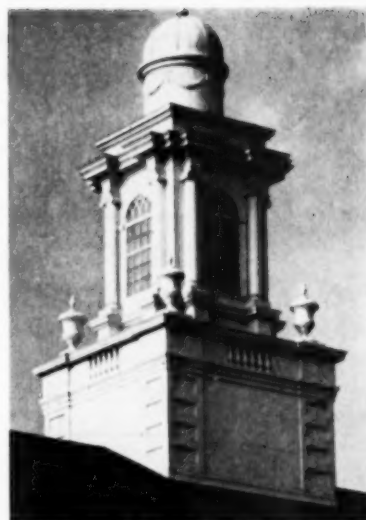
In his modernly equipped plant, Mr. Ballard keeps an old time crimping machine busy stiffening copper for flashings and occasional duct jobs (See Fig. 1). Another useful feature of his shop is that he has installed a rack for holding a roll of canvas for duct connections within easy reach of his mechanics, who within a few seconds can pull a strip to the desired length and cut off quickly what is needed (Fig. 2).

Roofing Jobs of All Kinds

As the company has grown, it has been handling larger and larger jobs. Roofing, insulation and sheet metal contracts have run to approximately \$250,000 on one installation alone. A good deal of factory work is contracted for, installations at the Delco and General Motors Plants recently having been completed. Jobs requiring from 4300 to 5600 squares of roofing have been handled.

George Ballard, Inc. is now completing a 16,000 lb stainless steel duct job that is singular. The duct is so constructed that every inch of inner surface can be washed and cleaned through a series of hand holes and massive cleanout doors. The stainless steel is 18-8, not polished 2B finish. Made with gaskets, the entire system can, when necessary, be disassembled for further thorough cleaning.

In keeping with the trend of bright and cheerful colors, the Ballards point to a beautiful tin roof (Fig. 3) painted green, that was installed over 20 years ago, made of Old Scott 4 cross, 40 pound tin that is in ex-



4 THE LEAD-COATED copper cupola on the Irondequoit Town Hall is a Ballard installation

cellent condition. At present, we are getting away from the monotonous habit of years, i.e., painting tin roofs red. When architects and home owners are convinced that tin can be painted with pleasant colors, more tin roofs will be sold on the better quality homes, according to Mr. Ballard.

Another job of which the Ballards are proud is the beautiful lead-coated copper cupola they installed on the Irondequoit Town Hall (Fig. 4). This job features many neat and sharply made mitres. There is not a piece of wood or wood framing in the entire tower, the framework being all steel. The metal work was fabricated in the Ballard shop and assembled on the job site. The urns, stamped by Miller and Doing, were assembled from 11 pieces.

These jobs reflect the old-time craftsmanship plus modern streamlining that characterize the firm of George Ballard, Inc.

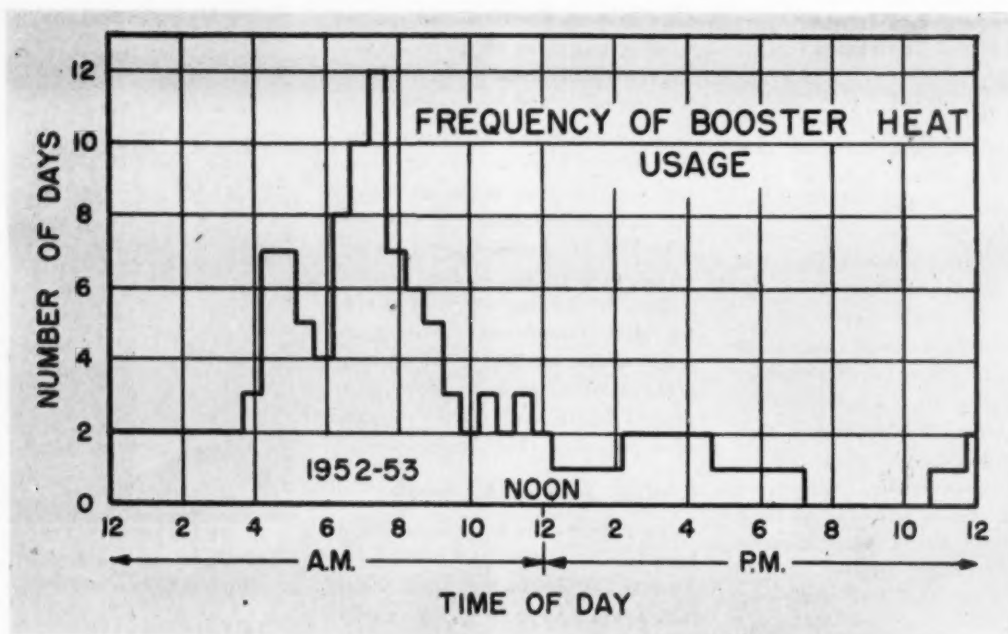
NEW AIR CONDITIONING MANUAL OUT

A newly revised edition of its Air Conditioning Manual has been published by The Trane Co., La Crosse, Wis. A fan chapter has been added which covers fan application and selection, basic fan laws, and duct design data and nomenclature.

The manual begins with a simplified presentation of the basic physical laws governing heat and cold. Also included are chapters on comfort and physiology, heat gain

and loss, properties of air and the psychrometric chart, refrigeration and calculations for the conditioned air supply. A reference section contains standard tables on air, refrigerants, pipe capacities for refrigerant liquid, and vapor and ducts.

This 380 page book is available from the company at \$5.00 a copy, and the new fan chapter is available separately for \$1.00.



How Heat Pumps Perform

. . . in providing heating and cooling in various parts of the country. Reports on test results for different types and sizes of units were given at a recent meeting

HOW WELL DOES the heat pump meet comfort requirements for winter and summer cooling? Recent field tests have been conducted to answer these and related questions, and the results obtained were reported at a symposium which was part of the American Power Conference held in Chicago recently. The papers covered units which use air, water and the earth as heat sources and sinks.

In his report on the progress made with air-to-air units, C. L. Biehn, Westinghouse Electric Corp., said:

"We wanted to know the answers to these questions: How much does the unit cost to install, to operate, and to maintain?

"Cities were selected for field tests on the basis of being representative of different types of climate. For this reason we felt that three main areas should be covered: the Southeast, Southwest and the Northern

fringe area. After selecting cities in these areas, we contacted the power companies supplying service to the respective territories to enlist their cooperation. Not only did they assist in making the initial installation, but they have also provided service to the units, collected the data, and maintained the instruments for us.

First Installation a 5 Hp Unit

"The first installation was made in Lynchburg, Va., in September, 1951. A 5 hp single phase unit is used with three 2 kw strip heaters installed for booster heat when needed. These are controlled by the room thermostat and are cut in as a single step. This type of control does have the effect of increasing the total power demand unnecessarily at times, thus placing a greater burden on the power company. It may also slightly increase the cost to the consumer where demand charges

are in effect. However, we did not feel that these two items were important enough to further complicate the controls of our first trial units, and so we preferred to work out the details of step control later on in our program.

"In conjunction with this it should be explained that the units are operated from a single thermostat having three stages. There is a 5 F differential between the heating and cooling stage, and a 2 F differential between the normal heating and the booster heat stage. For example, a thermostat set at 74 F would control the heating stage at this temperature. Booster heat would come on at 72 F and cooling at 79 F. Also on the thermostat is a switch for manual control of the circulating fan.

"The house selected in Lynchburg was an existing eight room ranch type house having a floor area of approximately 2500 sq ft, and a cubic content of about 20,000 cu ft. The foundation is a concrete slab in which the return ducts are laid. Each return runs from an outside wall to a large central duct running the length of the house and culminating at floor level in the garage where it connects with the heat pump. The outer walls are of standard brick construction and the inner wall is cinder block. Between the two is a 2 in. air space filled with concrete insulation. There is 4 in. of rock wool insulation in the ceiling of the entire house with a ventilated space above. The supply air ducts are run in this space over the ceiling and are insulated. Like the return, the main supply duct runs down the middle — the length of the house — with branches running off from it. Each room has one diffuser outlet in the ceiling, except the living room which has two. All windows have storm windows except the large double-paned picture windows in the rear. The calculated heat loss for the house was 55,530 Btu per hr at 10 F outdoor temperature and 70 F indoor temperature.

Operation Satisfactory after Leakage is Corrected

"Although the unit was placed in operation in October, 1951, it was not until February, 1952, that the system was operating to our satisfaction. Most of our difficulties were ironed out rather quickly as the installation and adjustments were completed. After the outdoor air duct and grille were adjusted, no trace of recirculation of outdoor air between intake and exhaust could be found. After balancing the air flow, we found that the temperature of the supply air in the rooms next to the garage was about the same as that leaving the unit, and that the temperature entering the rooms farthest away from the garage was within one degree of this temperature.

"According to the performance curves on the unit, arrived at through laboratory test, we expected that the balance between the unit capacity and the heat loss of the house would occur at about 23 F outdoor temperature. This did not appear to work out, however, for we required booster heat at considerably higher temperatures. We felt sure that the source of our trouble was

in the return air duct since the return temperatures appeared to be definitely out of line, especially at low outdoor temperatures, but it took considerable time to locate the difficulty. In fact, it was not until after we had completely altered the return air duct that we discovered that the ductwork under the house had been stopped at the inside face of the cinder block wall, and the ductwork in the garage continued from the outside face. In between, the cinder blocks were supported on steel angles, and the holes in the blocks formed an excellent stack for pouring cold air into the duct. As soon as this section was enclosed we found that the unit performance crossed the house curve almost exactly as predicted. However, it has been interesting to note that many times when the outdoor temperature drops to or slightly below this point for intervals of short duration and then rises, no booster heat has been required because of the "flywheel effect" of the house. For this reason we feel it is better to control the booster heat from the room thermostat rather than by outdoor air temperature.

"Once this leakage problem was solved, the remainder of our winter and early spring operation (that is, the heating season) was more than satisfactory. A summary of the collected data shows clearly the effect of correcting the duct leak. Although November and February had almost the same number of degree days, only about three-fourths as much power was used during the latter month. The big change was in the amount of booster heat required.

"Cooling the house was no problem, for at no time did the unit need to run for any extended period. It was interesting to note that most of the unit's running time occurred during the late afternoon and evening, after the peak temperatures outdoors had passed. This means that the unit benefits from the cooler air for the condenser which improves the operating conditions.

"The cost of operation for the first year averaged \$33.10 per month at the 1½ cents per kwhr rate for this region. Indications thus far show that this figure should drop below \$30.00 for the second season.

Second Installation for Smaller Home

"For our second installation, made in the beginning of December, 1951, in Miami, a 3 hp single phase unit was used. A five room house of the standard block and stucco construction common to this area, and costing under \$10,000, was selected. The floor area is about 825 sq ft and the cubic content is 6600 cu ft. This was an existing house and it was our aim to install the heat pump with a minimum of changes to the house. A supply duct was run through the house along the under side of the ceiling with outlets in each room. These would correspond to standard high wall supplies. A 28 by 16 in. hole was cut into the dining room wall and a short duct installed to act as a return. No booster heat is connected in this unit.

"The outdoor air circuit is a split duct taking air

(Please turn to page 103)



panel tells heating wholesalers —

“Get Into Summer Cooling”

... to increase year 'round business volume. Also urged: establishment of dealer training programs covering selling, installing and servicing of cooling equipment

THE HEATING WHOLESALER should plan to handle residential cooling equipment — if he does not already do so — as soon as he can arrange his business to absorb this phase of year 'round air conditioning. This advice grew out of a panel discussion

on residential air conditioning, held at the summer meeting of the National Heating Wholesalers Association, Asheville, N.C., June 21 to 24.

The 10 man panel on residential air conditioning consisted of three wholesaler members of NHPA (J. L.

Arata, vice president, Aramac Supply Co.; F. R. Green, president, Heating Wholesalers Co.; and G. C. Mason, president, Warm Air Heating Supply Co.); four manufacturers' representatives (G. W. Denges, vice president,

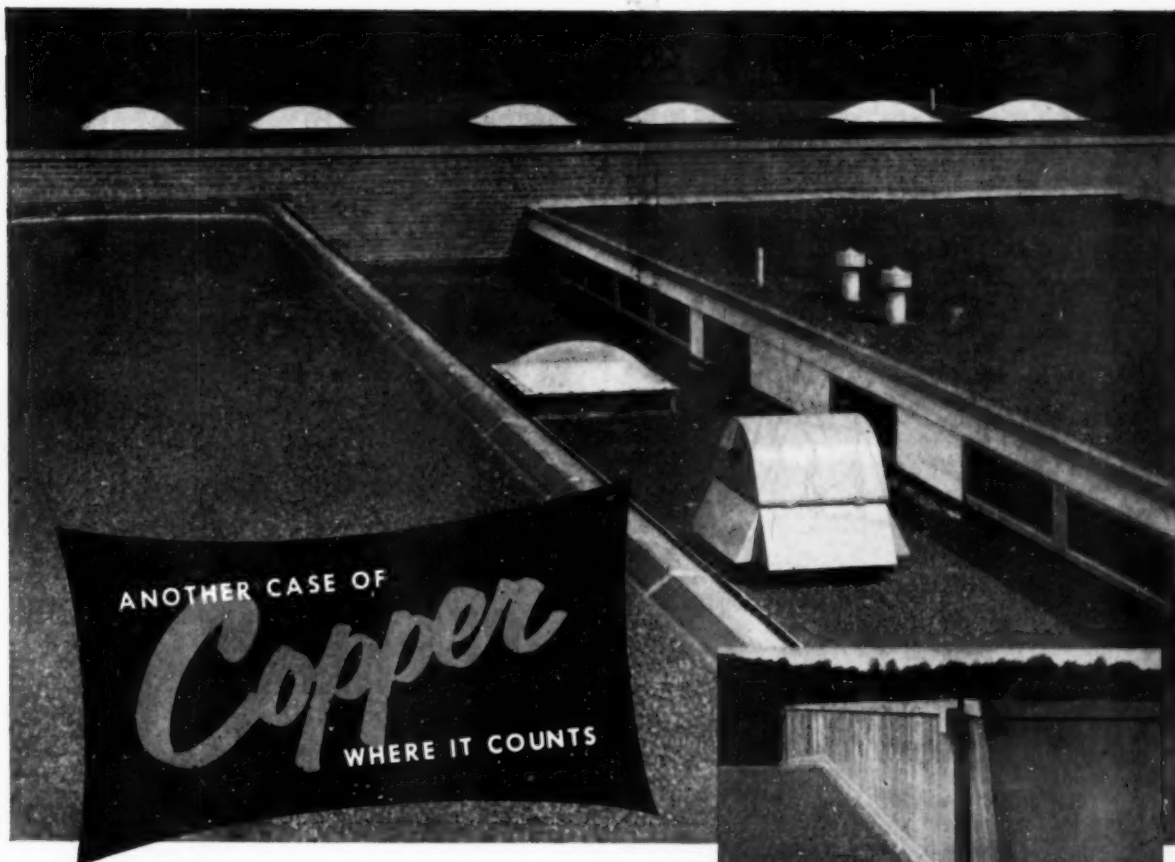
(Please turn to page 128)



FIRST STEP: REGISTRATION. C. Stuart Rambo hands the program to W. L. Troescher of Cincinnati (left), while Mary Frost completes the identification badge



AN INFORMAL BOARD MEETING included (l. to r.) W. H. Bowe, Jr., C. Stuart Rambo, George F. Wheelock, and Gail Mason



Some sheet metal contractors still associate the ancient metal copper with cathedral spires, mansard roofs and dormer windows. But the Mathy Company, of Washington, D.C., sheet metal contractors for the George Mason Junior-Senior High School, and many other well-known contractors, still consider copper the best single, all-around metal to work with; in fact prefer it to all others, old or new.

Here's why: That copper endures has been proven for centuries. Its ductility makes it adaptable to any shape or design. Copper cannot rust or rot, never needs paint for protection. It improves with age, taking on a green patina that gives added protection and beauty. Sheet metal contractors prefer to work with copper because it is so readily workable and takes solder to perfection. And when you check the many features of copper you'll find it has more desirable construction characteristics than any other single metal or alloy. It's the metal that will keep you out of trouble.

And now, with restrictions on the use of copper ended there isn't any reason why your next job can't have the many benefits of Revere Copper. See the Revere Distributor nearest you about Revere Sheet, Strip or Roll Copper for flashing. Particularly ask him about the money-saving advantages of Revere Keystone Thru-Wall Flashing.*

*Patented

GEORGE MASON JUNIOR-SENIOR HIGH SCHOOL
Washington, D.C. Architects—McLeod and Ferrara



LASTING PROTECTION for the vital spots on the roof of the George Mason Junior-Senior High is assured by the use of non-rusting Revere Copper for gravel stop facia, box gutters, downspouts, monitor skylights, expansion joints and miscellaneous flashing.

McLEOD and FERRARA, Architects of Washington, D.C., specified 7,000 lbs. of Revere Cold Rolled Copper for flashing, gutters, downspouts, etc. 1500 lbs. of Revere Lead Coated Copper was used for the monitor skylights. Gravel stops are 20 oz. copper while all other is 16 oz. Revere Distributor, York Corrugating Company, Washington, D.C.

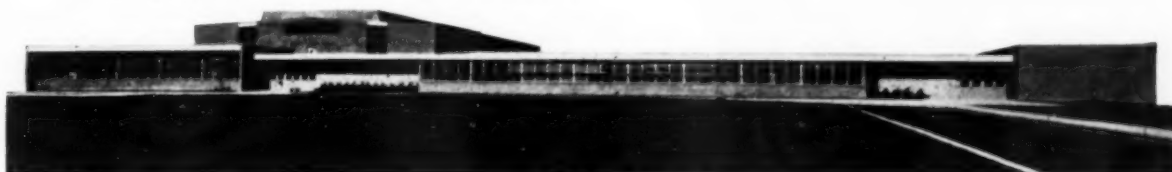
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THIS PROFIT- ...proves you can win the

Now you can have
Completely Automatic Heating
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THERMOMATIC COMFORT CONTROL #1295
NO WIRING!
ATTACH IN 3 MINUTES!

Saves for

No wiring foolproof!

AS ADVERTISED IN THE POST

GET READY



Send for this free profit-maker kit of sales ammunition. It's built around the attention-getting A-P Comfort Control Display and a powerhouse of sales-making mailers, stuffers, stickers and other proven merchandising aids. It has everything you need to create store traffic . . . and sell 'em too! And it's yours — free for the asking!

GO



get your share of the

Use this most powerful of all A-P sales campaigns . . . and you'll automatically benefit from A-P's heavy national advertising support. This packs additional wallop that gives you a barrage of over 51,320,604 sales messages that sell A-P automatic heating conveniences.

Smart dealers are taking advantage of the profit-packed punch of these free sales helps. They're perfect mates to the "years ahead" engineering and automatic conveniences of A-P Comfort Controls. Write today for full details.

PACKED SALES CAMPAIGN!

race for more space-heating dollars!

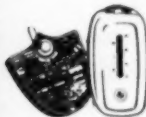
GET SET



You can get several types of A-P Comfort Controls — to fit any oil space heater equipped with an A-P oil control valve. The A-P Comfort Control gives your customers all the comfort and convenience of automatic heat control — at minimum cost.

Make sure you're *set* for the big heating season ahead . . . and the big demand for dependable A-P Comfort Controls. That means having plenty of them in stock to fill orders.

And don't forget to push these winners, too!



Electric conversion kit provides regular wall thermostat control for vaporizing oil-burner space heaters and furnaces. Complete with transformer and wire. Any owner can install.



Electric conversion kit for draft fan or circulation blower on heaters and furnaces. "On-off" or "on-slow speed" control. Provides simple wall thermostat control for fan-type heaters.

★ **Retails \$12.95***

- ★ Installs in only 3 minutes
- ★ Assures "round-the-clock" automatic heating comfort



And look at this easy installation. Owner can attach control himself with an ordinary screwdriver. Only two screws to replace.

big space heater accessory business

This new A-P Thermomatic Comfort Control will enable you to offer your space heater customers all the comfort and work-saving convenience of an automatic, built-in heating system — and for only \$12.95. It eliminates annoying temperature swings — works with the weather-man to maintain healthful, comfortable temperatures. And it cuts fuel bills — automatically!

*In Canada, \$15.95, including Canadian tax

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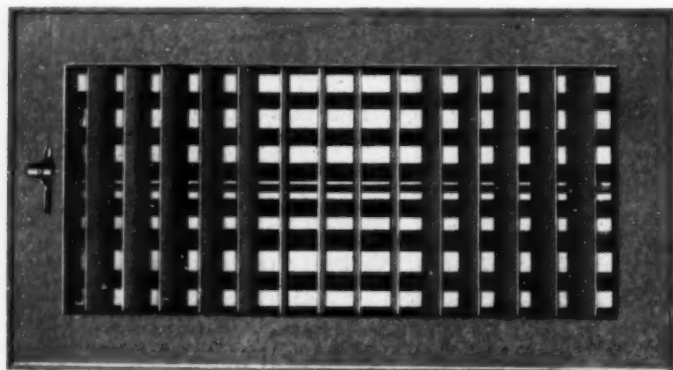
DEPENDABLE Controls

for Air • Liquids • Gases • Refrigerants



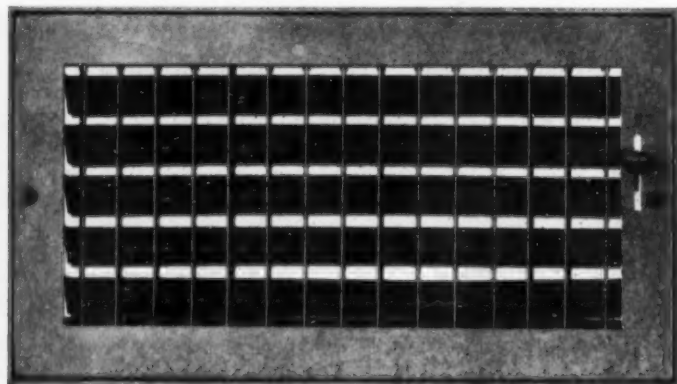
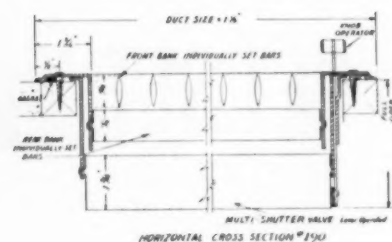
Your Best Registers For High Velocity A-C Systems

For cooling or heating or both, these U. S. Registers excel all others in high-velocity systems. They are the easiest to operate. Their rolled-formed **STREAM-LINED** grille bars give you complete air-flow control in the quietest possible manner.



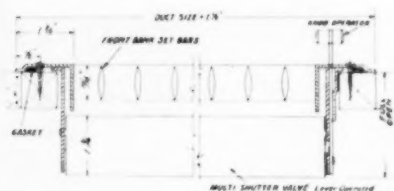
No. 190 U.S. MULTI-FLEX

This series — called the "wonder line" — features individually-set stream-lined grille bars for both front and rear banks, plus lever-operated rear valves to control air volume.

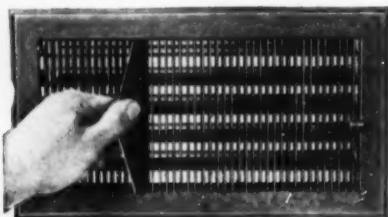


No. 200 U.S. NON-FLEX

This series has permanently-set stream-lined grille bars (vertical or horizontal) with lever-operated rear valves (vertical or horizontal) to control air direction and volume.



SEND FOR
NO. 53
CATALOG



U.S. No. 256 UNEXCELLED For RESIDENTIAL A-C INSTALLATIONS

Duo-deflection Four-way adjustment to control the air-flow plus complete freedom to use in any location with any style of duct or head, keeps the No. 256 far in the lead for residential forced-air systems.



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SOLD BY LEADING JOBBERS FROM COAST TO COAST

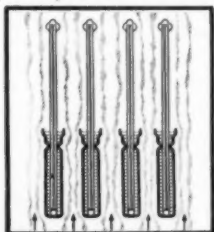
THE CONVECTOR HUMIDIFIER

doesn't choke even the smallest plenum

Compared to flat-bottom type humidifiers, Maid-O-Mist Convector Humidifier means

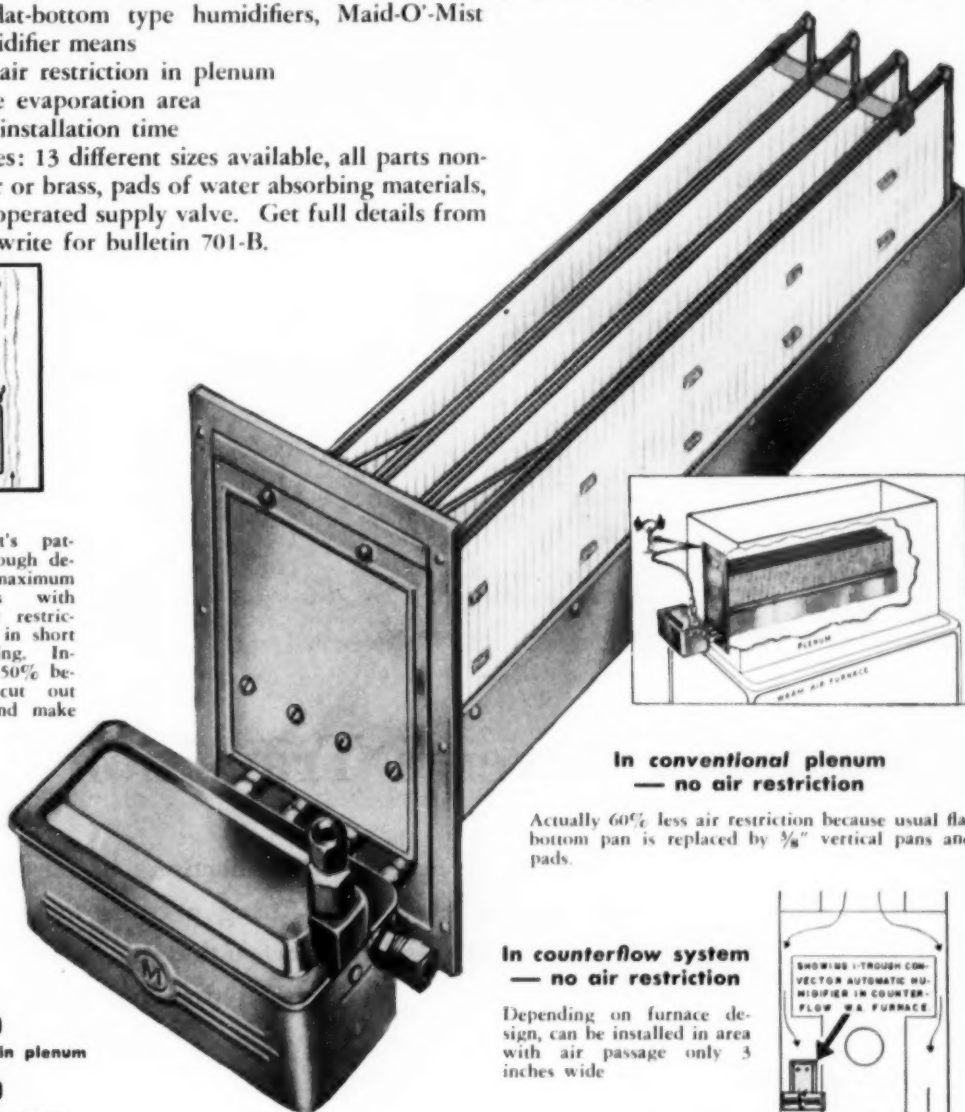
- 60% less air restriction in plenum
- 30% more evaporation area
- 50% less installation time

Other advantages: 13 different sizes available, all parts non-corrosive copper or brass, pads of water absorbing materials, automatic float-operated supply valve. Get full details from your jobber or write for bulletin 701-B.



Exclusive!

Only Maid-O-Mist's patented individual trough design offers such maximum evaporation areas with such minimum air restriction . . . essential in short cycle modern heating. Installation time cut 50% because you just cut out plenum opening and make water connections.



**In conventional plenum
— no air restriction**

Actually 60% less air restriction because usual flat bottom pan is replaced by $\frac{3}{8}$ " vertical pans and pads.

**In counterflow system
— no air restriction**

Depending on furnace design, can be installed in area with air passage only 3 inches wide



60%
less air restriction in plenum

30%
more evaporation area

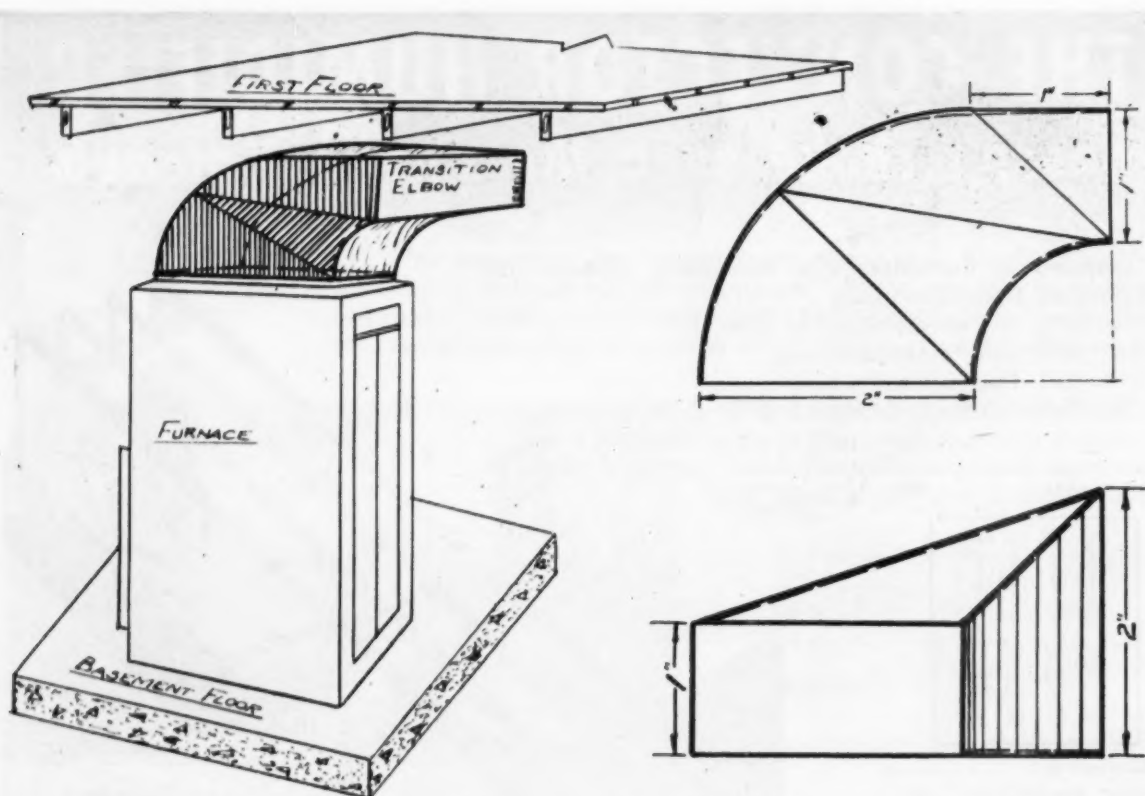
50%
less installation time



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WATER LINE CONTROLS . HEATING SPECIALTIES**

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1 THIS 90 DEG TRANSITION ELBOW provides for minimum static pressure loss and maximum free space, where headroom is at a premium

2 THE FRONT VIEW (*above*) and the end view (*below*) help in visualizing the development that takes place when

Making a Reverse Transition Elbow

. . . for furnace duct connections in basements with low ceilings. The fitting permits turning of the supply duct so that its narrow side is in the vertical position

Hugh B. Reid

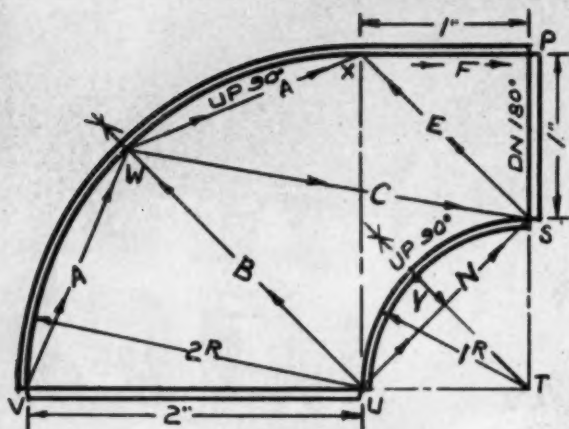
Instructor, Sheet Metal Pattern Drawing

THE TREND in modern building has been to hold room and basement ceiling heights to a minimum, many basement ceilings being as low as 7 ft. This raises the problem of installing a furnace and sufficient ductwork for supply air, while still leaving maximum headroom. Therefore, considerable emphasis has been placed on the use of elbows which give a minimum of static resistance and at the same time permit the turning of the

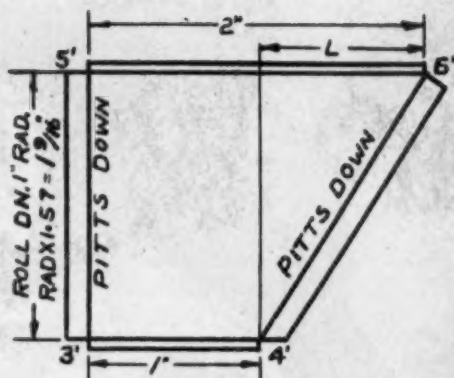
supply duct so that its narrow side is in the vertical position. One such fitting is the reverse transition elbow shown in Fig. 1. An easy way to lay out a pattern for this fitting is by the four point method described here.

The front view (Fig. 2, above) and end view (Fig. 2, below) help in visualizing the development that takes

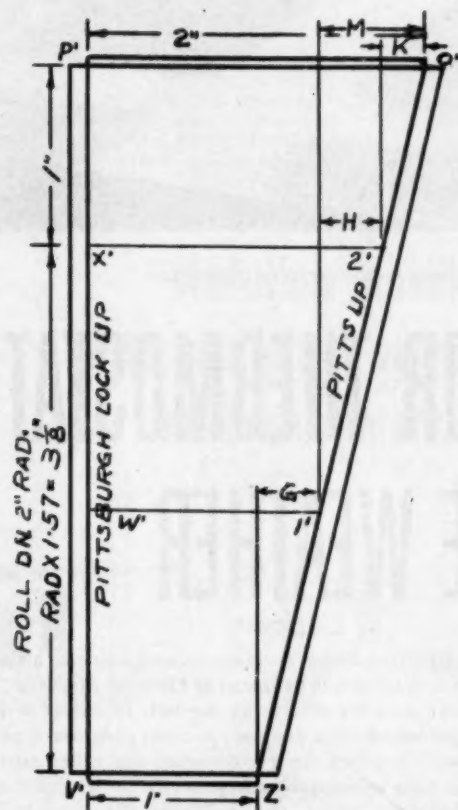
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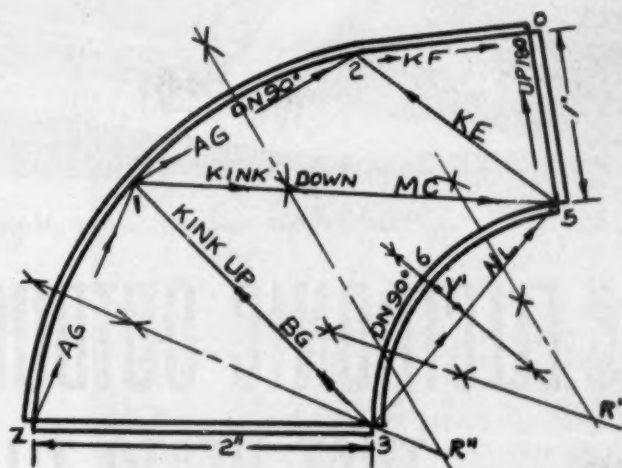
3 THE STRAIGHT SIDE ...



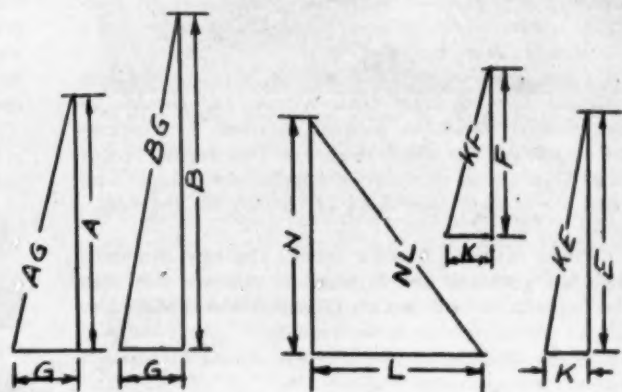
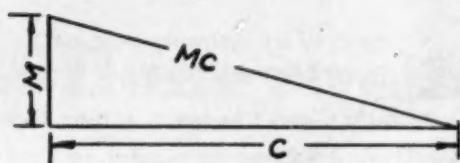
5 THE THROAT PIECE ...



4 THE BACK PIECE ...



6 AND THE OFFSET SIDE of the 90 deg transition elbow are laid out



7 VARIOUS TRUE LENGTH LINES are developed for use in the step by step layout of Fig. 6



Whether it's a new or old home

You'll profit more by selling Moduflow—the system with an

ELECTRONIC OUTDOOR THERMOSTAT THAT BEATS THE WEATHER

Profit-minded heating dealers are capitalizing on the fine sales opportunity of Honeywell Electronic Moduflow. It combines exclusive product features that make sales easier with a most attractive profit margin!

It's easy to interest prospects quickly in Moduflow because it operates differently from other systems and performs far more efficiently! Moduflow uses two electronic thermostats—one outside and one inside the house. They keep the indoor temperature tuned to outdoor temperature changes and create a wonderful new kind of comfort for the homeowner.

Electronic Moduflow is easy to install. The new, simplified Moduflow system is easy to wire and calibrate. Any man who can install an ordinary thermostat can install Moduflow without special training or equipment.

Electronic Moduflow is easy to service. That's because it's electronic, and has no moving parts.

Electronic Moduflow is ideal for new or old homes—with adequate central heating. Thus there's no limit to prospects for Moduflow! This means there's a big Moduflow profit

opportunity available every time you or your men make a call!

Now is the time to get started on Electronic Moduflow! You'll benefit from the advertising currently appearing in national magazines which is designed to create and pre-sell prospects for you. You can also get literature and other material to make your selling job easier.

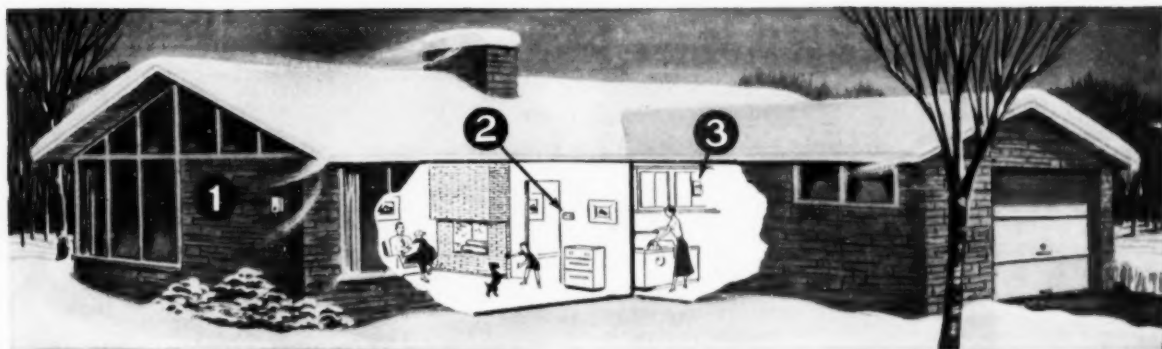
Add it all together—and you'll agree Electronic Moduflow is one of the most outstanding profit opportunities you've had in years!



*"90% of my customers now ask
for Electronic Moduflow"*

says heating dealer Claude Klingaman, of Gary, Indiana

"My customers don't build expensive homes, yet I find it's easy to sell them Moduflow once I explain its wonderful advantages. That's why I concentrate my sales efforts on Moduflow every chance I get."

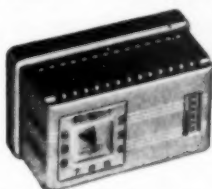


Here's how **Electronic Moduflow** works. The sketch above shows how Moduflow's three main electronic units

work together to *vary* indoor temperatures automatically according to outdoor temperature changes.



1 Electronic Weathercaster, outside, automatically raises or lowers control point of indoor thermostat, when outdoor temperature changes.

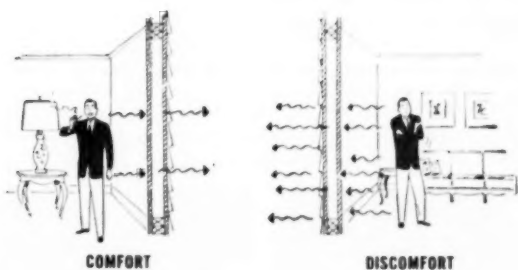


2 Electronic Clock Thermostat, inside, measures indoor requirements and sets percentage of burner "on" time needed to hold control point.



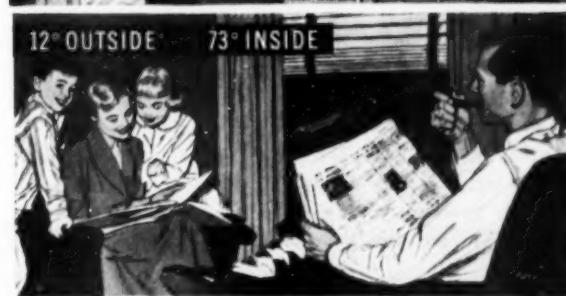
3 Electronic Relay Amplifier receives these signals and then cycles the burner according to the percentage rate set by the indoor thermostat.

Moduflow provides better comfort by varying indoor temperatures



Why people need varying temperatures

Tests show if indoor temperature is merely held constant when outdoor temperature falls, a person inside *feels* uncomfortable. This happens because as walls become colder, they "draw" heat from the body.



"Cold wall" problem solved by Moduflow

With temperatures at 50° (top sketch), occupants feel comfortable when indoor temperature is 71°. But if it drops to 12° (sketch above); heat loss increases, so *higher* indoor temperature is needed to compensate for colder walls. Moduflow does this *automatically* by raising control point of indoor thermostat.

MINNEAPOLIS
Honeywell



Electronic Moduflow

MINNEAPOLIS-HONEYWELL REGULATOR CO.
Dept. AA8-169, Minneapolis 8, Minnesota

Gentlemen: Please have your representative show me your "Dealer Profit" program for Electronic Moduflow.

Name

Address

City Zone State



THE IMPORTANCE OF SELLING to increase the already wide acceptance of central system heating was stressed by the warm air heating and summer air conditioning forum, consisting of (l. to r.) Tommy Thompson, Charles Giddings, Calvin Cheek, James H. Welch, Henry Voegeli, and Jack Smith

“Sell Benefits, Not Products”

. . . Georgia sheet metal men are told at annual convention. “Creative selling,” perimeter heating and cooling, and new sheet metal tools were featured topics

CREATIVE SELLING has replaced the high pressure style of selling prevalent a few short years ago, according to R. F. Walton, Johns-Manville Sales Corp. In his address to the members of the Roofing and Sheet Metal Contractors Association of Georgia, at their annual convention in Savannah, Mr. Walton said, “20 percent of the salesmen get 80 percent of the nation’s business. These men are able to do this by selling the benefits of their products, not the product itself.” The latter approach frequently is used by the average salesman, he said.

The creative salesman has both energy and ability. He points out to prospects that by purchasing the type of equipment he recommends, they will obtain the best service from the product and will have the satisfaction of having made a good investment.

Mr. Walton went on to say that it should be the ambition of every salesman to be among the top 20 percent. A “top notch” salesman has the security of a life time job with a good income. He also has the satisfaction of knowing that he is doing a service essential to the economy of our country — helping to create a market for the products which are being turned out by the nation’s factories. To be a salesman in the 20 percent bracket, a man must possess the willingness to

stand by high ethical standards, and he must feel that salesmanship is a profession.

Training Salesmen — A Good Investment

Sheet metal contractors and warm air heating dealers should remember that training a salesman is an investment, not an expense, Mr. Walton said. A firm should



OFFICERS FOR the coming year include (l. to r., seated) Hugh Jenkins, I. C. Mock, W. M. Jones, Sr. (Past President), and Leroy Still; (l. to r., standing) Charles Bryan, Charles Sapp, James H. Welch, and L. D. Herndon



BEING SERVED at an outdoor barbeque are: (l. to r.) Mrs. R. E. Grooms, L. D. Herndon, Roy Clarkson, and Mr. and Mrs. Grant Gillespie



HAVING SOME MUSICAL FUN after a busy day in the business sessions are: (l. to r.) H. D. Jones, M. C. Hitchcock, Larry Shields, Elmer Johnson, Charles Bryan, and Charles Sapp

carefully analyze how many salesmen it needs (this means that the potential market must be investigated*), what qualifications the jobs call for, and how the salesman will be compensated for his work.

According to Mr. Walton, the age of the prospective salesman has little to do with the results he achieves. Much more important are personal habits that will or will not reflect the company's reputation. These personal habits need to be examined carefully and should involve not only appearance, but approach and manner of speech.

Once a salesman has been selected and his training has commenced, it should never end. The training program should be held to a schedule and carefully planned. The best salesmen, according to Mr. Walton, are those who not only know the application of their product but know its limits too. Salesmen must know more than the information in the sales catalog and should not feel it necessary to call the office every time a prospective customer has a technical question.

The good salesman will have a sense of timing. He

won't wear out his welcome. Most important, he will have unlimited faith in himself, his product and his company.

Forum Discusses Heating, Insulation

The principles of good salesmanship as outlined by Mr. Walton were emphasized by the members of the warm air heating forum, who indicated that the continued acceptance of central system heating would depend upon how well the heating dealer conducted his sales program.

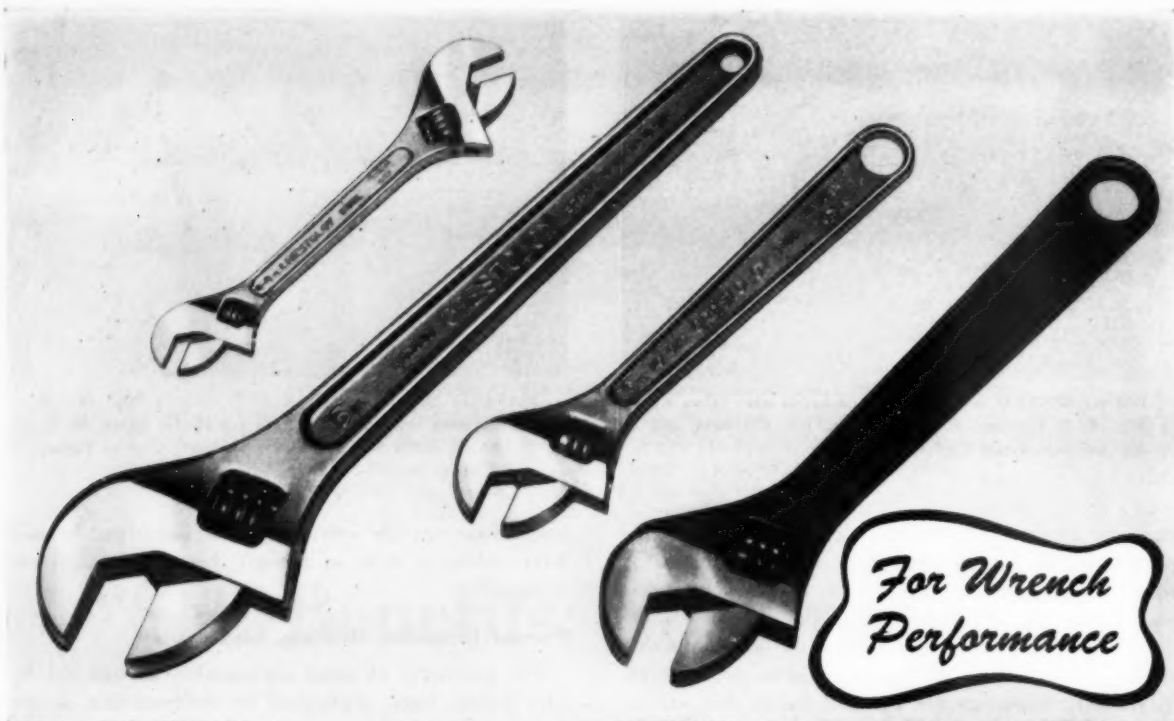
The panel consisted of Calvin Check, Lennox Furnace Co.; Lake B. Crawford, Owens-Corning Fiberglas Corp.; Charles D. Giddings, Waterman-Waterbury Co.; L. J. O'Callaghan, Dealers Supply Co.; W. Jack Smith, North Bros.; Tommy Thompson, The Thompson Co.; and Henry Voegeli, American Brass Co. The forum was moderated by James H. Welch, Valdosta sheet metal contractor and warm air heating dealer.

In answer to a question from a warm air heating dealer about the use of small round duct for perimeter heating and summer cooling, Tommy Thompson, The Thompson Co., said that the slab type home was the

(Please turn to page 127)



THE EFFECT OF RISING PRICES on the sheet metal and roofing industry was discussed by the sheet metal forum, consisting of: (l. to r.) Victor Johnson, Henry Voegeli, Barto Brown, Ned Murphy, I. C. Mock, R. W. McGarity, H. H. Herring, D. C. Gager, Grant Gillespie, T. G. Buchanan, and N. D. Roberts



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CRESCENT Wrenches are forged from selected carbon steel and specially heat-treated to increase their toughness and durability. Due to their lesser cost and relatively great strength, they are widely used in industrial and service operations where thinness is not essential. Available in Single End Patterns, 4" to 18".

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CAROLINAS OFFICERS for the coming year (seated, l. to r.) M. A. Apple, Rudy Barnes, Joe Piper, W. T. Fort, W. E. Hartin, Jr., and J. M. McKeithan; (standing, l. to r.) E. L. Scott, J. Roy Martin, Jr., Lokie Martin, James Barger, George De Lay, and G. A. Stewart

More Work for Sheet Metal Men

... is what the national association is aiming at through new activities, the Carolinas association was told at its annual convention.

Other topics: selling "quality work" and summer cooling

"THERE IS NO one item that contributes more to successful sheet metal contracting than to know the trends of the industry — and the best way to keep up with trends is to belong to a national association," the Carolinas Roofing and Sheet Metal Contractors Association was told at its annual convention, held June 18 to 20, at Myrtle Beach, S.C.

The speaker was Paul Stromberg, vice president of the Sheet Metal Contractors National Association, who outlined the work now being done by the national association to benefit the industry.

The association has drafted a *Code of Trade Practice for General Sheet Metal Work*, intended for distribution by individual contractors or their associations to the architects with whom they work. Mr. Stromberg urged contractors to request that architects put all the items of work listed in the code into their specifications.

"Many younger architects and engineers have come into business since the 'hey-day' of architectural sheet metal construction," he said, pointing out that these architects do not know all the things sheet metal contractors are qualified and equipped to do. "As a result,"

he continued, "a great deal of work we might be doing never shows up in the specifications we are asked to bid on."

Mr. Stromberg stressed that the time spent by contractors in contacting architects and giving them copies of the code (which is available free of charge) would be paid for "many times over" in the form of additional work.

Getting More Air Conditioning Work

The national association has prepared another code which may result in more ventilating and air conditioning work for sheet metal contractors. *The Code of Trade Practices for Ventilating and Air Conditioning* sets out certain policies and responsibilities which both the engineer and the contractor should assume. The code asks the engineer to put all ventilating and air conditioning work in one specification — including the equipment required.

Mr. Stromberg urged contractors to ask the engineer that they be allowed to bid on this work as prime contractors. He feels that the sheet metal contractor



THREE CAROLINA contractors—(l. to r.) C. E. Bourne, J. C. Ware, and Bill Arthur, Jr.—discuss the talks given at a technical session



MR. AND MRS. JOE H. PIPER (left) welcome Mr. and Mrs. Paul Stromberg of Washington, D. C. Mr. Stromberg spoke on the work of the national association



THIS FORUM, which discussed heating and summer cooling, consisted of (l. to r.) Ed Horn, R. J. Foster, Wayne Miller, V. D. Ramseur, Jr., Joe Bell, and Ed Long

too often becomes a subcontractor in this field, being relegated to the job of fabricating and installing the ductwork.

"I would like to point out," he said, "that ductwork is somewhat of a gamble on labor. On the other hand, there is no more certain profit than that which comes from selling fans, filters, controls, dampers, grilles, etc., that have been purchased by you from a reliable manufacturer, and to which you have added your markup."

He suggested that the same procedure be followed for the distribution of this code as was recommended for the first one.

The national association has also begun a program to produce five manuals of sheet metal construction. Two of the five manuals have already been printed. The first was *Gutters, Conductors, Conductor Heads*; the second, *Flashings*. The third manual, now in preparation, will cover skylights, ventilators, louvers, stage vents, monitors, and canopies.

The association plans to get copies of these manuals to architects so that they may design and specify sheet metal work by reference to plate number as indicated in the manuals. "If the architect will do this," Mr. Stromberg said, "he will get proper sheet metal construction.

And you will be doing something to eliminate the bids of the contractor who does not know how to install proper construction."

Other Publications Prepared

A fourth manual, *Manual of Duct Construction*, also is being prepared. It will cover every part used to make up a duct system; how parts shall be fabricated and erected; what are considered approved fittings; and what is proper construction of housings. As much engineering text as is necessary will be included to explain why certain types of construction are recommended.

Another service the national association is performing for the sheet metal and warm air heating industry is the preparation of a warm air heating code with a sample licensing ordinance for large cities and a performance bond and registration certificate for smaller communities where a full time inspector cannot be supported. In over 200 cities, the code is being used or is under consideration for use.

"The code is expected to assure high quality installations of warm air heating equipment and give the home owner the protection that he is entitled to receive from the warm air heating dealer," Mr. Stromberg said. The code, properly enforced, will reduce the number of installations being made by poorly trained and unqualified installers.

Move to Solve Subcontractors' Problems

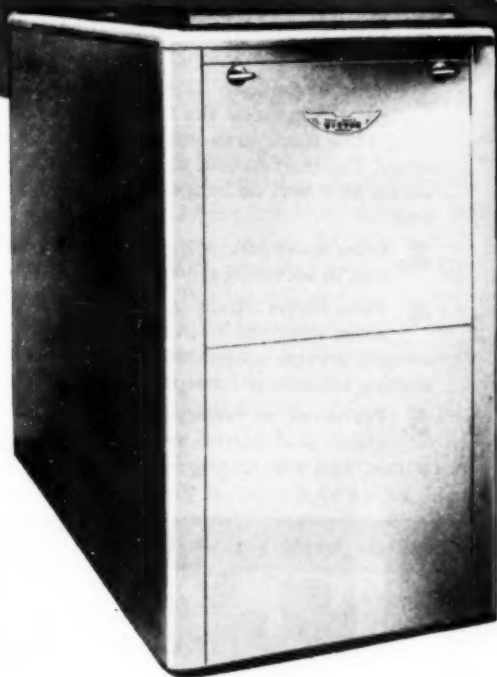
Mr. Stromberg returned to the importance of the sheet metal man being a prime contractor wherever possible. "The disadvantages of being a subcontractor need not be elaborated on," he said.

"Where the role of subcontractor is unavoidable, the national association has worked toward the improvement of the sheet metal contractor's position in dealing with the general contractor—especially on projects in which the Federal Government is involved," he said.

A group made up of national associations of subcon-

(Please turn to page 136)

...you can sell **MORE**
VICTOR furnaces in
 a competitive market
 because a **VICTOR**
 franchise gives
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OVER 60 YEARS OF QUALITY MANUFACTURING have made VICTOR the outstanding line in the heating industry. Our entire factory is devoted exclusively to the manufacturing of quality furnaces. You can **SELL VICTORS!**

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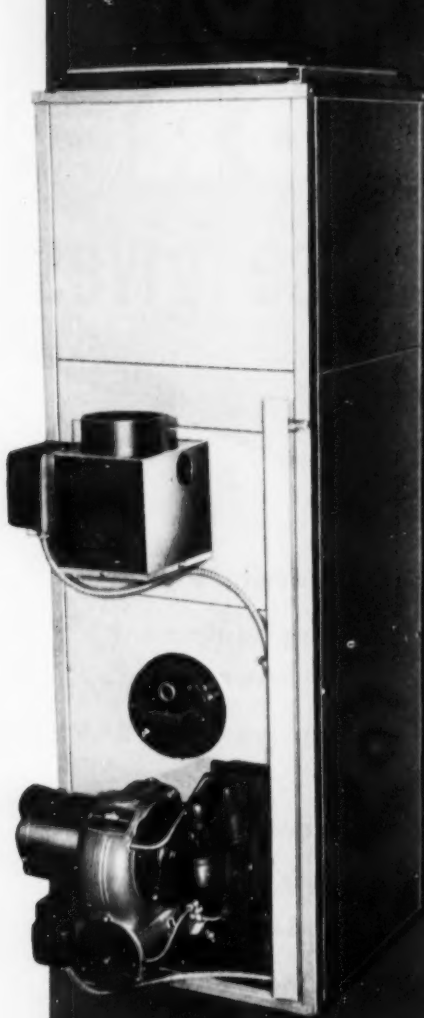
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This furnace meets all home heating requirements in the easiest, most convenient way you've ever seen. The same unit can be used for either conventional or perimeter warm air heating by merely rearranging the parts. The Winkler Universal is a complete package... everything included, except ducts, for a basement or utility room installation.

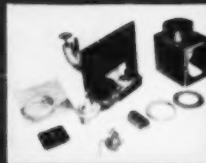
1. Casing and insulation. Clean, trim design—baked enamel finish. Cellular asbestos, faced with aluminum foil, produces an amazingly cool casing.

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Individual Winkler Gas Burner kits are provided for natural, manufactured, mixed and LP gases... and for natural and LP gas combination requiring an outside temperature switch.

For oil-firing, the Universal may be equipped with either the Winkler High Pressure or Low

Pressure Burner. Oil Burner kits include everything necessary for a complete installation—combustion chamber, controls, barometric draft, etc.

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A Builder's-Eye View of Residential Air Conditioning

. . . was presented at the packaged
air conditioner conference of the recent ASRE meeting.

Also described were the ideal home heating
cooling unit, control systems, and other equipment

"GOOD AIR CONDITIONING is not a 'gimmick' dreamed up by gadgeteers, but a basic aspect of fine living — and as such, it will sell homes." This was the opinion of E. Spiegel of the National Association of Home Builders. He was speaking at the packaged air conditioner conference which took place at the 10th semi-annual meeting of the American Society of Refrigerating Engineers, held June 28 to July 1 at Lake Placid, N.Y.

The home building industry is now producing at a rate of 1,100,000 new homes annually, of which about 50 per cent are for new owners, he reported. The other 50 per cent are built for people who desire a bigger, better, or newer home than the one they have. According to Mr. Spiegel, air conditioning can play a large part in creating a desire for a new home in this latter group.

In order to realize the promised potential in the replacement home market, Mr. Spiegel pointed out, it will be necessary to overhaul our mortgage and financing structure so as to provide for trade-in of houses, paralleling the example we all know in the automobile industry. Future plans must call for the gradual stepping up of home owners from one grade of house through successively better ones. Residential air conditioning could be the determining factor in getting such a program under way by providing the "better" house.

However, Mr. Spiegel pointed out, the air conditioning engineers need to do two basic things to aid the home builder. First, he felt, they should make the costs of air conditioning — installed cost and operating cost — a point of general information. At present the builder knows his installed costs to a fraction of a percentage point. However, the cost of adding air conditioning is comparatively unknown, he said. Likewise, operating costs are guessed at as anywhere from \$5.00 to \$35.00 per month, with the true figure being obscure.

The second basic goal of the air conditioning and refrigerating engineer should be to devise new condensing media. The shortage and expense of water in many places make this a "must" before full acceptance of residential air conditioning can be possible, he said.

Assuming good solutions to these final problems, the day of the air conditioned home is not "just around the corner" as has been freely predicted for years, but rather, is one easy step over the threshold, Mr. Spiegel concluded.

What's the Ideal Combination Unit?

Design considerations in combining summer and winter residential air conditioners were discussed by R. M. Thompson, Bryant Heater Div., Affiliated Gas Equipment, Inc. He cited five basic requirements which the ideal unit should satisfy:

Noise level. The noise level of a residential unit must necessarily be much lower than a commercial-type unit of similar capacity. Design engineers have accomplished this generally by using hermetically-sealed compressor units and by the use of large, slow speed blowers.

Service. Service should be made easy with access from only one side of the unit. Filter changing and lubrication should be simple and fast.

Design. The unit must fit the home, but no one unit will work to advantage in all types of homes. There must be three basic types of unit to match corresponding architectural treatments. They are: 1) the basement type where headroom is a minor limitation and floor area is practically unlimited; 2) the utility-room type, (the highboy) where floor area is all important and height is ample; and 3) the attic type, in which all component parts are strung out horizontally. Various refinements of the basic types, such as both upflow and downflow arrangements of the highboy, are required to meet varying job conditions.

Condensing media. Requirements in this category range all the way from straight city-water condensing to straight air condensing with many intermediate points such as water-cooling towers, evaporative condensers and distilled-water fan-coil units.

Cost. The most important limitation put on the design engineer is the one of producing a unit to satisfy all of the other criteria mentioned above within a cost price which will not prohibit its sale to the mass market.

The installed cost of the complete system should not exceed 10 per cent of the total cost of the house.

In addition to the five primary design objectives, the engineer must also give consideration to heating-cooling capacity ratios which vary from one part of the country to another, and to the use of separate blowers for winter and summer, since design air quantities usually change for each of the seasons. Finally, to complete a line, there should be an add-on cooling unit to be used in combination with existing heating systems, Mr. Thompson said.

Four Steps to Successful Installation

The design and installation of a packaged air conditioning system in existing homes was covered by W. B. Cooper, American Radiator and Standard Sanitary Corp. He described the four steps required of the successful installer:

The Survey. In addition to figuring heat loads and making equipment layouts, the survey must also include a study of the existing building services, i.e. water, waste and power, and their relation to the new cooling equipment. He should also try to determine at this early stage if there are basic faults in the existing heating system which the owner may be expecting the new equipment to correct.

Equipment Selection. After his survey has established the capacity of required cooling equipment, the installer must select and plan the type of equipment needed to fit into the existing system. He must choose from the basement-type, the utility-room-type and the attic-type, and must consider whether or not a separate blower for the cooling season is required.

Installation. The completed job, regardless of the care taken in surveying and planning, is only as good as the craftsmanship used by the mechanics who install it. Care and supervision must be given to see that good practices are followed.

Service. Proper instruction in operation of the system should be given the new owner and a service organization must stand behind the installation to insure success in this field of installing.

Mr. Cooper emphasized that three cardinal points should govern the designer and installer of good residential air conditioning. They are: 1) be sure to have enough air quantity; 2) have enough refrigeration capacity; 3) have good air diffusion. The last point usually means the replacement of existing stamped-face grilles with double-deflection type adjustable grilles, according to Mr. Cooper. He considers the type of grille far more important than the location of the outlets in the room. High-wall, low-wall, baseboard or floor outlets seem to work equally well providing they are of the diffusing type, he stated.

Control Systems Should be Standardized

One simplified design should be adopted for residential air conditioner control systems in the interest of mass production economy, according to F. Y. Carter,

Detroit Controls Corp. Mr. Carter pointed out that his company produces controls for several manufacturers and that each differs from the others in some minor way.

He said that a "packaged" control panel, mounted on or adjacent to the equipment, could contain all the transformers, switches and relays needed. A second package, to be mounted on the wall in the conditioned space, would contain the heating and cooling thermostats, the fan switch and the selector switch. The installer could then interconnect the two packages with color-coded wire according to a printed wiring diagram. In cases where there was no fresh-air damper, for instance, he would simply leave certain terminals unconnected.

Mr. Carter feels that such a control set-up would actually result in lower costs because of uniformity and mass production methods, even though certain component parts of each system may be left unused.

Need More Water Saving Devices

R. E. Holmes, Worthington Corp., described and evaluated five basic types of water saving devices and pointed out the increasing need for such devices with the upsurge in residential air conditioning. He covered the air cooled condenser, the fan-coil unit, the cooling tower, the evaporative condenser, and the water-cooled two-stage system.

Mr. Holmes also presented his concept of the planned suburban community of the future, which in addition to running fresh water, sewers, gas and electricity pipes under the streets, would run two additional pipes carrying cooling water for air conditioning. These would come to and from a central community spray pond or cooling tower and would be circulated by municipal pumps to all the residential air conditioning equipment, thereby solving the problem of water conservation without adding the drawbacks of individual water savers.

A fan-coil unit for conserving water was described in detail by Paul Wyckoff, Airtemp Div., Chrysler Corp. (speech presented by Joseph Lovely). The unit consists of a blower, two auto radiators, and a circulating water pump. It is housed in a cube shaped sheet metal housing and may be located indoors or outdoors.

After the pipe connections are made to the refrigeration condenser, the system is charged with distilled water. It is then sealed for normal operation and never needs another filling. This feature means that the condenser never will need cleaning or de-liming. The system also preserves the hermetically-sealed refrigeration circuit intact.

The drawback of the relatively high condensing temperature, 125 F, is partially offset by the fact that the condenser does not lose efficiency with age due to liming or dirt.

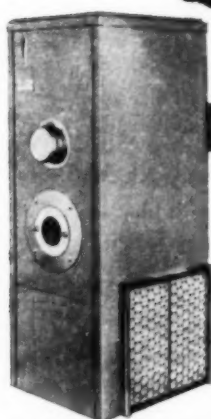
Learn about Heat Pump Operation

D. W. Lynch, General Electric Co., reported on the data gathered after one year of a three year field test on an air-source heat pump made in 3 and 5 hp sizes.

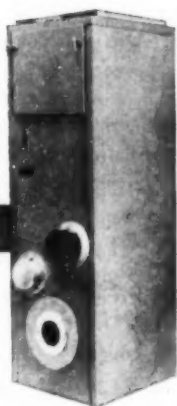
(Please turn to page 162)



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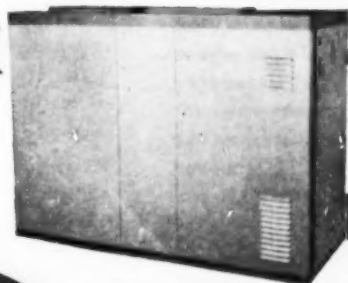
HIGH BOY



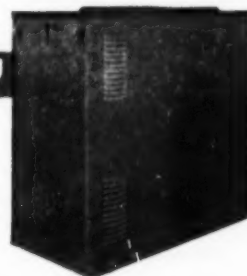
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*There is a Kaustine Furnace or
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● Kaustine engineering enables you to give your buyer an efficient *top quality* heating plant at the very *lowest cost* to you.

● These dependable furnaces are not only designed for economical operation but for simple, convenient installation...another Kaustine cost saving feature.

● The Kaustine line offers forced air heating units delivering from 65,000 to 250,000 B.T.U.'s in models for every type of installation in any style or size of home.

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YOUR BUSINESS AND THE LAW



When Is a Dealer Liable for Accidents?

Albert W. Gray

Even when the exact cause of an accident is unknown, the dealer is liable if the circumstances surrounding it were in his control and the facts indicate lack of reasonable precautions. However, in many cases, negligence cannot be inferred

THE REMODELING of a dwelling included the installation of a warm air furnace. This had been the subject of a contract under which the furnace was to be installed with the necessary connections for heating five rooms on the first floor, with one supply stack to the second floor.

After this furnace had been installed with the ducts from the furnace to the registers in two of the first floor rooms and connections for the other rooms held in abeyance until the alterations had been completed, the dealer lighted the furnace and instructed the owner in its operation.

Two days later, on opening the door to a room adjoining the living room, the owner saw the wall around the warm air supply register in flames.

A neighbor driving by a few minutes later saw the smoke coming from the house, stopped his car and seeing flames in the cellar attempted to put out the fire with water from a nearby well. He stated:

"The first place I saw fire was around the duct coming from the furnace. The ceiling was low, and it seemed as if there wasn't much space between the duct and the basement ceiling. The duct was bare — without any in-

sulation. There was some asbestos in the cellar on the floor but it did not look as if there was much space between the duct and the floor joist."

A bus driver also saw the smoke and he too tried vainly to stop the fire. "The flames were all in the ceiling over the furnace — over the top of the furnace and around the ducts that led from the furnace," he said in his description of the fire. "I particularly noticed that there was no insulation at all over the top of the furnace."

In an action brought by the owner of this house against the contractor for negligence in the installation of the heating system, the jury gave a verdict in favor of the owner and the contractor appealed.

The court of appeals in sustaining this judgment followed a decision in which it had been said:

"Where damage to property is caused by the operation of some instrumentality within the exclusive control of a person, under circumstances which would justify the inference that it would not have occurred had that person exercised ordinary care, negligence may be presumed as a rational inference from those facts."

Unexplained Cause Can Indicate Negligence

In the case cited, the thing causing injury was certain. However, responsibility also may be placed when the cause of damage is unknown.

Several years ago, a man going from his home to work walked along a foot path paralleling the right of way of the railroad. A train carrying a gondola car loaded with railroad cross ties approached. When it was alongside this path, the load — from some unknown cause — slipped, and a half dozen of these ties struck the man, breaking his leg and causing other severe injuries.

In its decision of the action brought by the injured man against the railroad the court of appeals summarized this rule governing the liability for damages from unknown causes of this character:

"The man was guilty of no negligence in being where he was at the time he was injured. He had no control over nor was he in any way connected with the loading or management of the cars or trains upon the railroad. If the cross ties had been properly loaded there exists no reasonable probability of their falling off and if by accident the ties had become displaced, it was the duty incumbent upon the railroad and its servants to readjust them in such manner as to prevent the happening of the accident."

In this decision there is the same underlying principle of law that imposes liability on a contractor for injuries such as those consequent upon the defective installation of the warm air furnace in the first case. The person injured in this accident was a stranger to the causes

Albert W. Gray, author of this article, has had twenty years experience as an attorney in the courts of New York City. He has written widely on legal matters and is the author of "The Family Legal Adviser".

(Please turn to page 130)

HOW HEAT PUMPS PERFORM —

(Continued from page 81)

from and returning air to the car port. We were rather skeptical about this situation at the time of installation, and it was agreed that if recirculation or trapping under the roof became evident, the intake would be extended out under the side of the car port. Neither materialized under either normal conditions or when the car was parked in front of the duct.

"Actually this installation has needed very little attention at all since the initial adjustments were completed. At first the system was a little noisy because of the large open return, but simple baffling in the duct eliminated this. The thermostat had to be moved from the dining room to the living room wall between the air outlets to provide normal operation. It had originally been installed next to the return duct and therefore abnormal cycling occurred. The only difficulty with this installation is that we never approach the capacity of the unit. A 2 hp unit would probably be adequate.

"The costs are very much in line with our expectations, averaging between \$10.00 and \$11.00 per month for the first year's operation. These are based on the local 1½ cents per kwhr rate. Incidentally, this house is not insulated, and at the end of this winter's operation we plan to insulate the ceiling to see how much we can reduce the cost of operation during the next year. Differences in kwhr consumption for a similar number of operating hours have been particularly noticed on this installation due to the varying amount of operation of the indoor fan by use of the manual switch on the thermostat.

Feels Air-to-Air Unit Shows Great Promise

"As in Lynchburg, the personal reactions of this family to the heat pump are very favorable. Although cooling is the prime requisite in Miami, it is accepted as a rather normal addition, but it was the heating which made the impression, since the accepted type of heating used in this area is not too comfortable.

"Our average COP (including all motors — fan and compressor) for the first season was approximately 2.2 in Lynchburg, and 2.8 in Miami. Although these COP's are not quite as large as we had hoped, we have been able to improve the performance of our laboratory unit to some extent. There is nothing to indicate at present, though, that great increases will be made in the near future.

"As expected, quite a few minor adjustments were required as these units were installed and first operated. The units have cut out on safety controls for various reasons. Two relays and one fan pulley have been replaced. This is the extent of service problems. There have been no failures of any major part of the units and not one hermetic system has been opened since it was put into operation.

"On the whole, our experience has indicated that the air-to-air residential heat pump shows great promise.

There is certainly much more to be done in all phases of this subject by the various interests concerned. However, we believe that our program has provided results which are both informative and interesting, and which should prove of value in this field of residential heat pump development."

Tests Utilize Earth as Heat Source

In the St. Louis area, since 1946, field tests have been in progress in which the earth and air are used as heat sources for heat pump installations. G. S. Whitlow, Union Electric Co. of Mo., outlined the work accomplished to date. Describing the tests utilizing the earth as the source, he said:

"The original ground coil consisted of 10 helical coils. The circumscribed cylinder of each was about 14 in. in diameter, 12 ft long, and made of 1¼ in. steel pipe. These were installed about 10 ft apart (vertically) in the ground, so that the tops were 4 ft below grade. They were connected in two parallel circuits, each consisting of five coils in series. Copper was not used because of its scarcity at that time. Also a copper coil of this design would have been structurally difficult. This ground coil did not prove satisfactory on the original installation; therefore, it was supplanted by a horizontal coil of entirely different design. This second ground coil consists of four sections of 1½ in. copper pipe, each about 400 ft long, for a total buried length of 1600 ft. These are laid in a series of trenches which are 4 ft deep and 12 in. wide, and the four coils are connected in parallel. The first 10 or 12 in. of back-fill is sand in order to get more intimate contact and better moisture retention.

"The selected depth of 4 ft was based on several considerations. It had been deduced and proven that in cold weather, heat would not flow into the ground area fast enough to maintain earth temperatures above freezing. It was reasoned, then, that depths much below the maximum St. Louis frost line of 3 ft could not be justified. Although greater depths would give higher earth ambients and theoretically higher performance factors, recovery would be more rapid with coils closer to the surface. Also, 4 ft is a depth within easy limits of standard trenching machines.

"Numerous thermocouples were placed in and around the coil mat. At two places, couples were installed 4, 6, 8 and 12 ft below grade. The ones 4 ft below grade were actually in the bottom of the trenches. In addition, thermocouples were installed remote from the ground coil mat at the same elevations in order to establish reference ambient temperatures. The readings of these thermocouples have been continuously recorded since 1948.

"During one of the winters, half of this ground coil was shut off and the home heated by the remaining half. Performance was acceptable, but not as satisfactory as that obtained from the use of the entire coil. Careful studies of data obtained from this and previous operation led to the conclusion that heat extraction rates of

30 to 40 Btu per hr per lineal ft of buried pipe can be readily attained.

Refrigerant Introduced Directly into Ground Coil

"These experiments had demonstrated that successful heat pumps could be designed and built, that operating costs were competitive with combustion heating, and that the earth was a good heat source. Tests had revealed, however, that further improvements could be made by expanding and condensing the refrigerant directly in the ground coil. This would eliminate the cost of a large and expensive heat exchanger and a circulating liquid pump and motor. COP would be improved by the elimination of pumping losses.

"Little data was available regarding the problems which would be encountered when refrigerant would be introduced directly into the ground coil. One of the major fears was that entrained oil might become trapped in the ground coil, reducing its heat transfer capacity and leaving the compressor crank case with an unsafe supply of oil. It was recognized that modern compressor design somewhat reduced the quantity of entrained oil, but nevertheless the danger still existed. A ground coil design was adopted to meet as nearly as possible two conflicting criteria. The pressure loss must be kept at a minimum, but velocity must be sufficient to assure complete and safe oil return.

"Also, there was skepticism concerning leaks. Investigation into experiences with buried copper tubing for other purposes somewhat allayed fear of trouble from this source. Careful attention was given to the underground brazed joints and thorough pressure tests were made before and after back-filling. Subsequent improvements consist of fabricating and testing complete ground coil loops before installing.

"This first experimental 'direct-expansion' ground coil consists of 900 ft of $\frac{3}{8}$ in. copper tubing installed in 450 ft of trench. There are six separate loops, each approximately 150 ft long terminating at each end in a header. Liquid refrigerant is introduced by a multi-port expansion valve, with the compressor suction connected to the other header for the heating cycle. Each of the six loops is separately valved so that the amount of ground coil may be varied as tests progress.

Ground Coil Length Adjusted

"In order to exhaustively test this ground coil, it was connected to a 3 hp belt driven compressor, furnished by a local manufacturer and calibrated by calorimeter tests in his laboratory. A standard air handling unit and condensing coil were arranged to permit adequate condensing conditions and to permit adjustment of air quantity.

"After about five months' operation with the complete coil in service, it became apparent that 900 ft was more than sufficient for a 3 hp compressor. Half this amount was tried, but it was quickly determined that this was too small to provide sufficient evaporating surface. Operation finally settled down to an endurance test with 600

ft of ground coil. The set-up was permitted to operate and extract heat from the ground for 17,000 continuous hours, equivalent to about seven heating seasons in the St. Louis area. Recording instruments were used to check performance.

"After operation was stabilized, suction pressures of about 25 psig were attained late in summer, gradually decreasing to about 13 psig the following April. As ambient temperatures increased during the second summer, suction pressure raised to about 20 psig, and this pattern repeated itself during the second year of continuous operation. Thus the ground coil requirements for a 3 hp compressor had been closely bracketed.

"Experience showed that in the St. Louis climate, 4 ft was a satisfactory depth for ground coils, but it was realized that installation costs would be reduced if less depth could be proven satisfactory. To gain more information on this, in the fall of 1952 a new ground coil was installed adjacent to the experimental ground coil already described. This new coil was identical in every respect, except that it was buried only 30 in. below the surface. It was connected to the same refrigeration equipment. It is now under test and it will be interesting to compare results after a complete season of operation. Data taken so far is not very encouraging.

Installation is Made

"The operating experience on these installations gave confidence in the success of ground coil heat pumps. Consequently, in the fall of 1950 a heat pump was placed in service in a small residence in St. Louis. This was the first complete heat pump using direct expansion in the ground coil and the first installation where all equipment was installed in one cabinet. The unit consists of two 3 hp compressors and the necessary auxiliary equipment. The cabinet containing the equipment is 48 x 27 x 79 in. high. The ground coil consists of 900 ft of $\frac{3}{8}$ in. copper tubing laid in parallel loops and installed in a plot of ground only 30 ft wide by 50 ft long. This installation incorporates all the experience which had then been accumulated.

"Between November 1950 and April 1951 the average temperature was 35.5 F and the accumulated degree day deficiency was 4743. During this time the heat pump held the house to temperatures between 72 and 75 F, with a total power consumption of 4474 kwhr. The cubic content of the heated area is 10,274 cu ft and the calculated heat loss is 40,000 Btu per hr for 0 — 70 F design conditions.

"Needless to say, these experiments have strengthened the case for ground coils. Early successful experiences with ground coils as heat sources continued to be verified by operating data. It was realized early that ground coil temperatures above freezing could not be maintained. Although it would be desirable to operate at higher suction pressures, it was evident that this could not be done with reasonable lengths of ground coils. Freezing the earth is not entirely without benefit. Although there is a slight sacrifice in efficiency, some good characteristics accrue."

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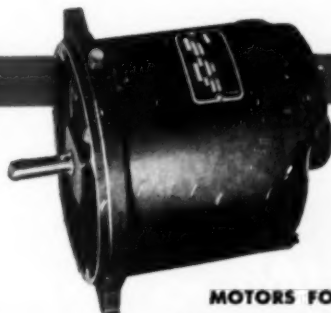


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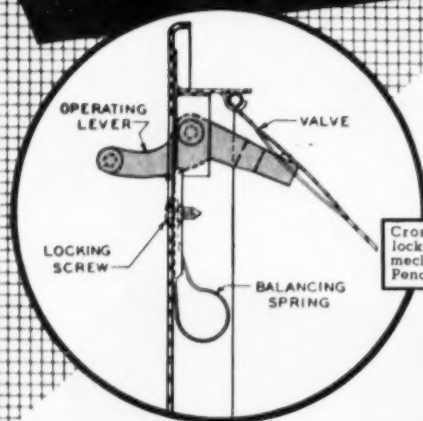
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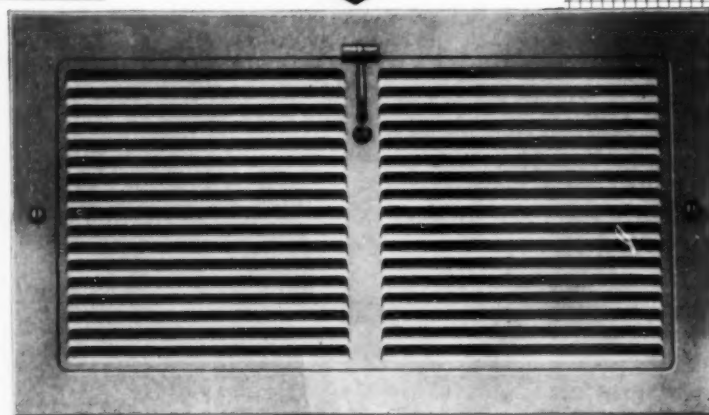
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For complete information on Auer Air Conditioning
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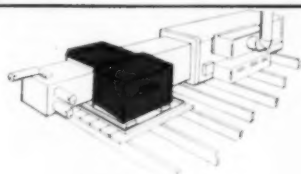
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LENNOX "STOWAWAY" Air Conditioner



A basement installation with LO-BY furnace.

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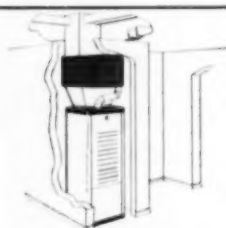
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LENNOX "FLAT-TOP" Air Conditioner



A closet installation with HI-BY furnace.

LENNOX "FLAT-TOP" Air Conditioner



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boys, horizontals and basement models, with inputs from 60,000 to 210,000 BTU. There are excellent Armstrong conversion burners for all gases, and special burners to convert any Armstrong oil furnace to gas with minimum installation cost and maximum efficiency. Most Armstrong gas furnaces are available with the Armstrong Dual-Fuel burner (natural to LP gas). The

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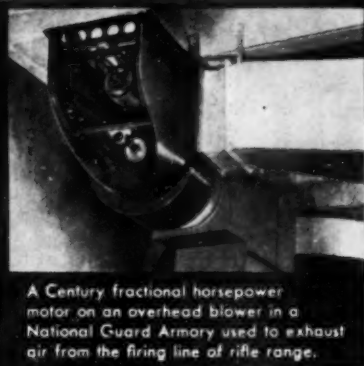


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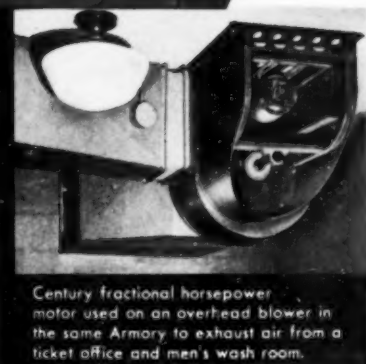
Please address Dept. AA at our plant nearest you.



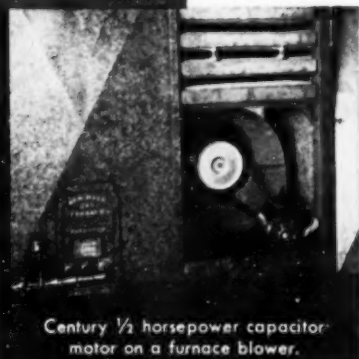
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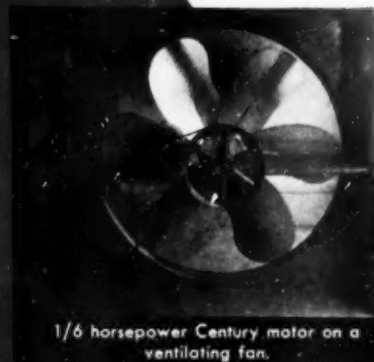
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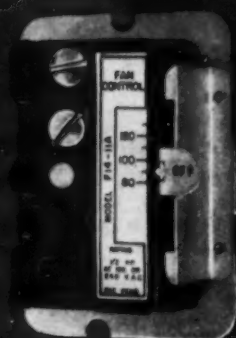
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WHAT ASSOCIATIONS ARE DOING



NEW OFFICERS of the Sheet Metal, Air Conditioning and Roofing Contractors Association of Pennsylvania for 1953-54 are: (l. to r., seated) E. W. Liebermann, C. F. Luppold, John Henke; (l. to r., standing) Bob Warren, Harold Zimmerman, Gilbert Keir, Frank Coleman, and Elmer Scarborough

Pennsylvania Contractors Elect State Officers

THE ANNUAL CONVENTION of the Sheet Metal, Air Conditioning and Roofing Contractors Association of Pennsylvania was held in Erie, June 18 to 20. Charles F. Luppold was elected to serve a second term as president. Other officers elected were: John Henke, first vice president; Elmer Scarborough, second vice president; Harold Zimmerman, third vice president; Earl W. Liebermann, secretary-treasurer.

Directors with term ending in 1953 are R. J. Cronan, F. J. Ostroski, Louis Trost; those with term ending in 1954 are A. R. Hoffman, W. L. McBride, J. E. Harper, Jr.; those with term ending in 1955 are Frank Coleman, Gilbert Keir, and Bob Warren.

The three day program featured addresses by J. D. Wilder, Secretary, Sheet Metal Contractors National Association; Wm. Loche, Minneapolis-Honeywell Regulator Co.; and A. L. Veverka, Follansbee Steel Corp. A panel discussion on operating overhead was conducted by John Henke. Joseph Proie, Sr., moderated a small pipe warm air heating forum.

Entertainment consisted of a picnic on Presque Isle, square dancing and the annual banquet.

New Tax Law Affects Michigan Contractors

A BULLETIN from the Detroit Warm Air Heating Association describes the business receipts tax law recently passed by the state legislature. The tax is based on gross receipts from any activity for gain or profit, less 1) any taxes except income tax; 2) moneys paid for material and equipment for jobs, subcontractors, permit and inspection fees, etc.; 3) interest and rents paid; and 4) cash discounts allowed. (Employment cost and de-

preciation are not deductible.) Either the sum of the items above or 50 per cent of gross receipts, whichever is the greatest, may be deducted, and there is also a statutory deduction of \$10,000 per year. Thus, a contractor with an annual volume of \$100,000, after deducting 50 per cent and taking his \$10,000 exemption, would have a taxable income of \$40,000. As the tax rate is 0.004 per cent, the tax, in this instance, would amount to \$160 for the year. The tax is payable quarterly, and \$2500 of the statutory exemption may be taken each quarter.

Evansville Group Sponsors Midyear Meeting

THE EVANSVILLE LOCAL Sheet Metal Contractors' Association, in cooperation with local supply firms, presented an interesting program at the southern Indiana district meeting of the Sheet Metal and Warm Air Heating Contractors Association of Indiana. The meeting was held on July 17 at Kokies Restaurant, Evansville. The board of directors of the state association was in session throughout the afternoon at the Hotel Vendome.

Dayton President Appoints Committee Chairmen

ROBERT BUTLER, president, the Sheet Metal, Furnace and Roofing Contractors Association, Dayton, gives as his association's three major objectives: 1) increased membership; 2) cooperative advertising; and 3) a standard practice code.

At a recent meeting, President Butler appointed John Moellering chairman of the publicity committee. Other committee chairmen named were: Vance Heymann, code and ordinance; Gene Noonan, entertainment; Dick Budde, labor; and Robert Barker, membership.



SOME OF the contractors and their friends who attended the annual picnic of the Associated Air Conditioning Contractors Association of Lake County, Ind. and Cook County, Ill.

Contractors Attend Annual Picnic

THE ASSOCIATED Air Conditioning and Sheet Metal Contractors Association held its annual picnic at Green Lake Grove, Burnham, Ill. on July 12th. Over 60 members, their families and friends gathered to enjoy the occasion. Entertainment consisted of contests for the youngsters, with prizes for the winners. The grownups participated in the activities by playing ball and pitching horseshoes. Some champions were crowned.

"Indoor Comfort" Emblem Developed

TOTAL ATTENDANCE figure for indoor comfort schools held in Canada for the years 1947-1953 stands at 3573. The average attendance for the 12 schools this year was 47 delegates per school.

The Canadian chapter has been working for some time on an "Indoor Comfort" emblem to be used by dealers in their advertising. The emblem is now completed and ready for distribution.

NAFM Elects New Officers

AT THE ANNUAL MEETING of the National Association of Fan Manufacturers, Inc., held in Absecon, N. J., the following officers were elected: J. M. Birkenstock, president; R. A. Wasson, vice president; and L. O. Monroe, secretary-treasurer.

Tri-State Meeting to Be Held in Florida

THE ROOFING and Sheet Metal Contractors Association of Florida will be hosts this year to the governing boards of the Carolinas and Georgia associations at the regular joint meeting of the boards of the three associations, to be held at Daytona Beach in September.

Illinois Committee Studies Group Insurance

A COMMITTEE appointed by the Sheet Metal Contractors Association of Illinois is working on a group insurance plan to be submitted for consideration at a forthcoming meeting. The committee's first step is to find out whether or not contractor members are interested in providing such a welfare plan for their employees, and it is asking all members to submit their views.

Coming Events

Nov. 9-12 — 8th All-Industry Refrigeration & Air Conditioning Exposition, Public Auditorium, Cleveland. Sponsored by Refrigeration Equipment Manufacturers Association. W. A. Siegfried, General Chairman, 1509 W. Liberty Ave., Pittsburgh 26.

Dec. 7-9 — National Heating Wholesalers Association, Inc., Annual Convention. Conrad Hilton Hotel, Chicago. C. Stuart Rambo, Executive Secretary, 27 E. Monroe St., Chicago 3.

Feb. 4-5 — Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Annual Convention. Hotel Severin, Indianapolis. Frank E. Anderson, Executive Secretary, 439 S. 17th St., Terre Haute, Ind.

Feb. 24-25 — Michigan Heating and Sheet Metal Association, Annual Convention. Pantlind Hotel, Grand Rapids. N. J. Biddle, Secretary, 3035 E. Grand Blvd., Detroit 2.

Time and place of the 1954 annual convention is being discussed by the board of directors. The directors have found it necessary to plan such meetings almost a year in advance in order to be sure of securing hotel accommodations for the dates desired.

Ohio Builders Providing for Air Conditioning

ACCORDING to the Ohio Sheet Metal Contractors Association *News*, 20 per cent of the builders in Ohio are either installing full air conditioning equipment or installing the facilities so that the customer may install his own equipment. The *News* urges association members to give early attention to the matter of adding cooling equipment to their lines and thus be prepared to share in the opportunities for business presented by this rapidly expanding field, as many sheet metal and warm air contractors are doing in other states.

*Men who know
call for...*

COP-R-LOY[®]

GALVANIZED SHEETS



For over 25 years, users of galvanized sheets have looked to Wheeling. For sturdy COP-R-LOY sheets are *doubly* protected against corrosion. *First*, by Wheeling's COP-R-LOY formula in the base metal. *Second*, by Wheeling's rugged galvanizing. Result—COP-R-LOY jobs look better, last longer!

Steel does it better... COP-R-LOY does it best!

WHEELING CORRUGATING COMPANY • WHEELING, WEST VIRGINIA

ATLANTA BOSTON BUFFALO CHICAGO COLUMBUS DETROIT HOUSTON KANSAS CITY
LOUISVILLE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA RICHMOND ST. LOUIS

Now!



SPECIFICATIONS: OC-7 delivers 70,000 BTU/Hr.; length, 21"; width, 21"; height, 70". Also OC-9 model to deliver 90,000 BTU/Hr.

it's easy to sell the "no cellar" home with **fluid heat** COUNTERFLOW UNITS

● Fluid Heat's Famous counterflow heating units, OC-7 and OC-9, are specifically designed to provide quiet, dependable and healthful perimeter heating for small, compact houses without basements.

They give you all the selling power of a well-built heating unit combined with a rapidly expanding market in the homes-without-basement trend. No wonder these Fluid Heat units are the most wanted winter air conditioners in your territory.

So, go after the small houses and bungalows . . . armed with the sales appeal of these Fluid Heat Counterflow units. You'll find them easiest to sell because they offer immediate delivery, pricing to meet competition, compact design and zero inches clearance!

For full details write to: FLUID HEAT DIVISION, Anchor Post Products, Inc., 6720 Eastern Avenue, Baltimore 24, Maryland; or Colbaugh Street, Red Oak, Iowa.

**NATIONALLY
ADVERTISED**



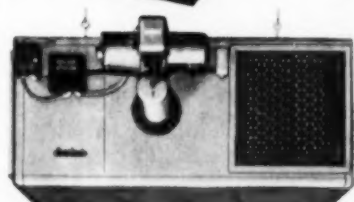
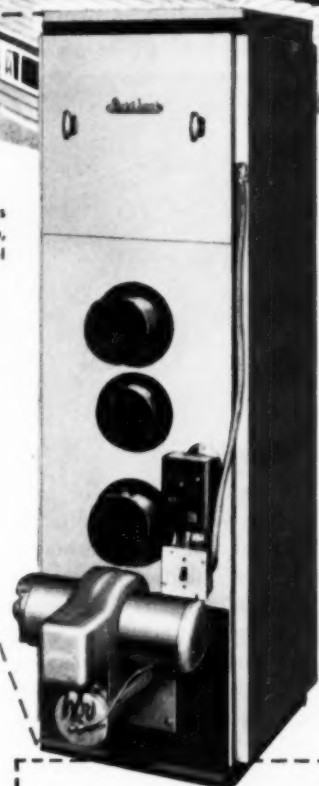
fluid heat

AUTOMATIC HEATING EQUIPMENT

"WORLD'S ECONOMY CHAMPION"

Division of ANCHOR POST PRODUCTS, Inc.

Sales Offices and Factories: Baltimore, Md. and Red Oak, Iowa



**AND WHERE FLOOR SPACE
IS PRECIOUS . . .**

homes with crawlways, retail shops,
garages, filling stations and super-
markets . . .

**YOUR BEST BET IS FLUID HEAT
SUSPENDED CEILING TYPE FURNACES!**

A FLUID HEAT UNIT FOR EVERY HEATING PROBLEM

OIL-FIRED UNITS



Famous Fluid Heat Pressure Burners. Four models, with firing rates from 7/10 to 12 gallons per hour.

Famous Fluid Heat Wall Flame Rotary Burner. Two models with firing rates from 1/2 to 4 1/2 gallons per hour.

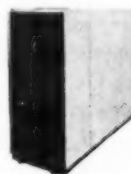


Famous Fluid Heat Boiler Burner Units. Six models, rated from 300 to 1090 sq. ft. of standing steam.

Famous Fluid Heat Warm Air Furnaces. Seven models, from 70,000 to 335,000 B.T.U. per hour.



GAS-FIRED UNITS



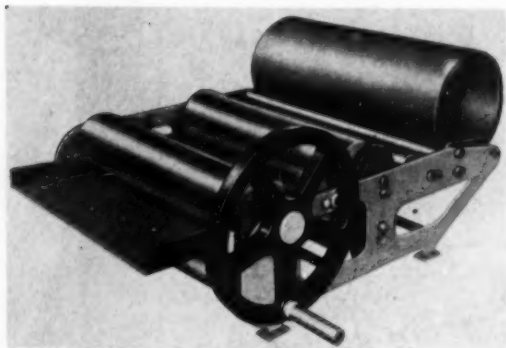
New Fluid Heat Gas-fired Warm Air Furnaces with rated inputs of 70,000 to 140,000 B.T.U. per hour.

Single-port, Fluid Heat Gas Conversion Burners. Rated inputs of 75,000 to 300,000 B.T.U. per hour.



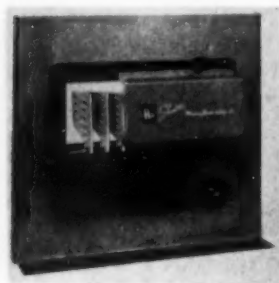
EQUIPMENT DEVELOPMENTS

The latest information on manufacturer's developments is presented here with brief summaries of the applications of these products. For new literature giving product information which is available see page 164.

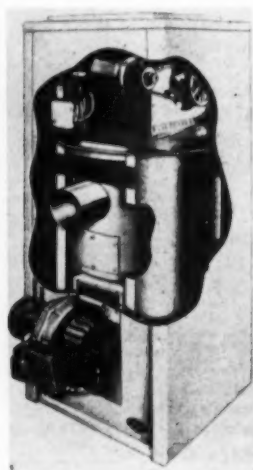


Pan Forming Machine

NEW PAN FORMING machine to be used with seamless roll terne roofing — Follansbee Steel Corp., 140 Stanwix St., Pittsburgh 22. The machine is portable and hand-operated, and will turn up the edges of a 50 ft. roll of terne in one minute, the company states. The operator inserts the continuous roll of metal at one end of the machine and threads it through a set of rollers. The speed with which the pans are formed depends on how fast the operator is able to use them.



Above: Humidifier



Right: Winter Conditioner

Furnace-Mounted Humidifier

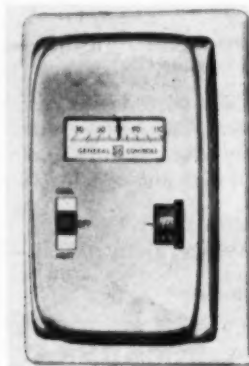
MODEL 450 HUMIDIFIER, for warm air heating, which is designed for mounting on the casing of the furnace or heater — Skuttle Mfg. Co., 4099 Beaufait Ave., Detroit 7. Only the working surfaces of the glass plates are in the warm air stream. If there is 3 in. or more space between furnace and casing, the unit will fit, the company states. Float chamber and plate pan are combined. Installation requires a slot in the heater casing.

Winter Conditioner for Perimeter Heating

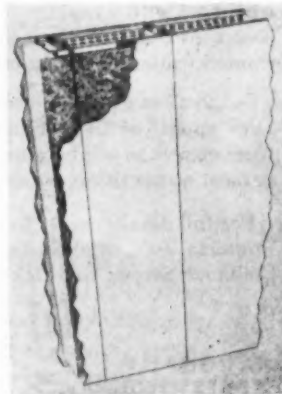
SERIES 523 COUNTERFLOW oil fired highboy winter air conditioner specifically designed for perimeter winter heating — Thatcher Furnace Co., Centre St., Garwood, N. J. It is factory assembled. The front flue is designed to permit easy access to controls, and the front radiator cleanout and blower compartment door facilitate cleaning, servicing, and inspection. The furnace is engineered for low stack temperatures, and ample filtering area is provided, the company states.

Two-Way Thermostat

MODEL T-70H two-way thermostat for controlling cooling as well as heating — General Controls Co., 801 Allen Ave., Glendale 1, Calif. It has a three-position switch with "Off," "Heat," and "Cool" settings. In cold weather, the thermostat regulates furnace output. The "Cool" position and the temperature regulating dial signal room temperatures to air conditioning controls. The unit has a four-wire, low voltage thermostat cable which connects with both heating and cooling controls in year 'round units.



Thermostat



Curtain Wall Panel

Insulated Curtain Wall Panel

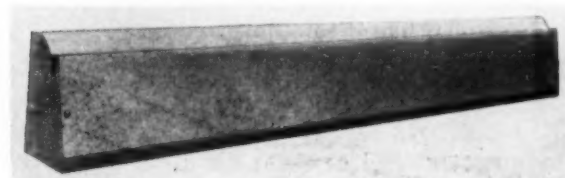
INSULATED METAL WALL PANEL designed for economical curtain wall construction — Steelcraft Mfg. Co., 9017 Blue Ash Rd., Rossmyrne, Ohio. The panels, for all types of commercial and industrial buildings, are especially suited where high unbroken wall areas are common. Panels are lightweight, available in galvanized or painted steel, aluminum or stainless, flush or fluted. They are factory assembled, including the core of fiber glass insulation. Panels may be applied either horizontally or vertically.

Oil Burner

MODEL LP LOW PRESSURE oil burner with a capacity of 0.4 to 1.50 gph — Bard Mfg. Co., Evansport Rd., Bryan, Ohio. It features quiet operation and high CO₂ readings, according to the manufacturer. Features include a non-

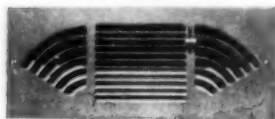


clog, low pressure spray tip; positive shutoff valve; easy-access air tube assembly; and swing-away transformer. A Sundstrand two stage low pressure standard fuel unit with built-in lift pump permits use with underground fuel tanks and on suspended furnaces.



Baseboard Diffusers

"FAN-AIR" BASEBOARD DIFFUSERS for perimeter heating — Premier Furnace Co., Lock Box 150, Dowagiac, Mich. Three sizes are available: 3 ft long, for use where room requirements are less than 4500 Btu per hr (units can be used in multiple); 5 ft long, for use where room heat loss is from 3000 to 6500 Btu per hr; and 8 ft long, for use where heat loss is 4500 to 9000 Btu per hr. (Capacities are based on 4 in. diameter supply ducts). The diffusers blanket outside walls and windows. A removable face plate is designed to simplify installation.



Above: Register



Right: 3 Way Valve

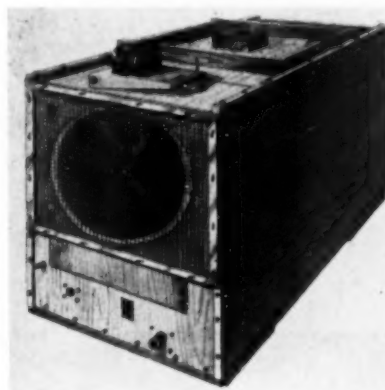
Register for Small Round Duct

REGISTER No. P-26 for small round duct installations — The A & A Register Co., 8327 Clinton Rd., Cleveland 9. It is now available in a 12 x 4 in. size. The face

is of 20 gage steel, and the register is offered in prime or metallic finish.

Valve for Fuel Oil Lines

TWO-TANK "Kantleak" valve for service on fuel oil lines — Anderson Brass Co., 5303 12th, Detroit. The solid bottom and packed top design of the three way valve are intended to assure trouble-free operation. Use of the valve on original equipment makes it easier to hook up an extra oil tank when needed, the company states.



All-Redwood Cooling Tower

ALL-REDWOOD "Aquatower" cooling tower designed for localities with a high corrosion incidence — The Marley Co., 222 W. Gregory Blvd., Kansas City 13, Mo. It employs forced draft design with vertical air discharge, the air being blown through the tower and discharged vertically at the end of the cooling chamber. It is available in three models for the 5 to 10 ton range. The nail-less redwood tower filling will not warp, crack, or sag, the company states. Mechanical equipment and filling are designed for accessibility.

Aluminum Foil-Kraft Paper Insulation

"REFLECTIVE" INSULATION composed of aluminum foil bonded to a kraft paper and designed to reflect up to 95 per cent of the radiant heat rays that strike it and to act as a vapor barrier against moisture — The Ruberoid Co., 500 5th Ave., New York 36. It is offered in rolls containing 250 sq ft, and with single or double reflecting surfaces. It may be installed using a ruler, shears, and a stapler or hammer and tacks. Regular studding or rafters may be used as support for the insulation. Air space should be provided on both sides. This can be done by cutting the foil-backed paper to widths slightly greater than the center-to-center distance of the studding or rafters and "bowing" the insulation between the studs or rafters.

Arc Welder

MODEL SR-600 selenium rectifier type d-c arc welder, with a welding range of 125 to 750 amp — Miller Electric Mfg. Co., 718 S. Bounds St., Appleton, Wis. It

(Please turn to page 146)

make money in a new market with champion's small pipe systems

Champion's modern small pipe systems make efficient, economical central heating possible for even the most thriftily constructed of the new, small homes . . . open up a vast, new market in remodeling heating systems of older homes. Both extended plenum system and individual pipe system are available in Champion's famous standardized pipes and fittings. Easier to install—they'll give you more jobs in less time.

IT PAYS TO STICK WITH A CHAMPION!

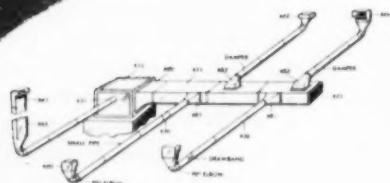
Pipes and fittings **GUARANTEED** to fit perfectly! That's because each piece is made from precision dies. It pays to let **CHAMPION** eliminate time-consuming shop work . . . simplify your installations. A complete line of both small and conventional pipes and fittings available for immediate shipment.

WRITE FOR NEW GENERAL CATALOG

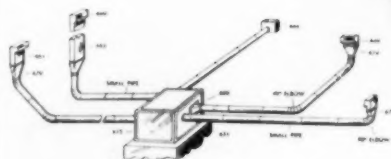
Brand new—just off the press! Describes complete **CHAMPION** line of pipes and fittings, including conventional, small, and perimeter pipe and fittings.



CHAMPION FURNACE PIPE COMPANY
311 Eaton Street, Peoria, Illinois • Phone 6-4639



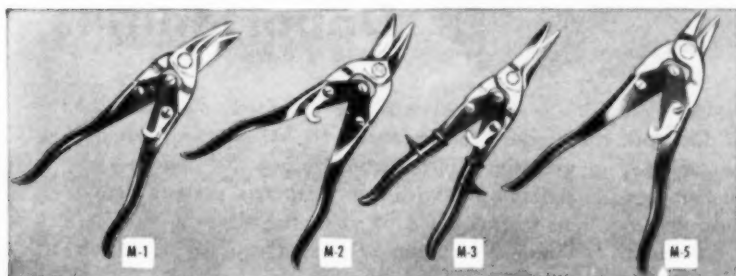
EXTENDED PLENUM SYSTEM



INDIVIDUAL PIPE SYSTEM

"We feature WISS SNIPS because they sell best with fewer returns"

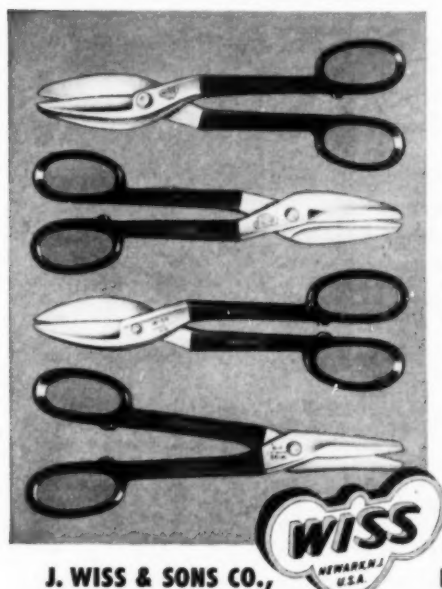
J. R. Gabel of Hibbard, Spencer, Bartlett and Co., Evanston, Illinois, agrees with other distributors of Wiss metal cutting snips. There are several reasons why they are the choice of professional workers everywhere — why they sell better, with fewer returns. Wiss snips are produced largely by the handwork of skilled workers. Each pair is rigidly tested and guaranteed perfect. Bolts are set precisely to reduce wear and to increase cutting power with least effort.



WISS METAL MASTER SNIPS: Compound action design delivers amazing cutting power. These 10" snips cut with about one-half the effort required for standard 12½" snips. One edge serrated to prevent slipping. M-1 (cuts left) and M-2 (cuts right) are designed to cut the most intricate scrolls and circles. M-3 is for shallow arcs and straight cutting. M-5 Bulldog Heavy Duty snips are tops for notching, nibbling and cutting shallow arcs in sheet metal as heavy as 16 gauge.



Wiss inlaid blades are made of high carbon crucible steel welded to a hot drop-forged frame to provide the extra service demanded by professional workers.



WISS INLAID SNIPS

High carbon crucible steel welded to a hot drop-forged frame provides that extra service demanded by professional users everywhere. Six Straight Cutting sizes from 11½" to 17", including Bulldog Snips for notching. Three Combination® Cutting sizes, 12½", 13½" and 14½".

WISS SOLID STEEL SNIPS

For those whose requirements are less specialized than the professional user. Hot drop-forged of fine carbon steel, they meet or exceed government specifications. Four straight cutting sizes, 8" to 12½". Three Combination® Cutting sizes, 7" and 13" including 16" Bulldog Snips for notching.

*Made with straight blades, but ground and shaped so they readily cut curves and irregular shapes as well as straight.



Wiss snips are hot drop-forged of the finest steels available.



Highly skilled craftsmen make final adjustments to assure that Wiss snips will cut perfectly for a long time.

J. WISS & SONS CO.,

NEWARK 7, NEW JERSEY

Manufacturers of Shears, Scissors, Pinking Shears, Metal Cutting Snips and Garden Shears

NIAGARA Announces

1. YEAR-ROUND AIR CONDITIONING



**Provides
Summer Air
Conditioning
... DOUBLES
Profit
Opportunities**

Niagara refrigerated-air Home-Cooling Units are designed to use the blower, filter and ductwork of the forced-air furnaces beside which the units are installed. Semi-hermetically sealed compressor, cleanable tube condenser and liquid refrigerant (Freon) receiver, all serviceable on location. Operate with low voltage room control.

The cooling units are designed to match the famous Niagara Series 50 AC furnace with the exclusive Niagara cast-iron heat exchanger — installable also with your customers' present forced-air furnaces of ANY reliable make.

Cabinets of 2-ton and 3-ton capacity units are 22"x37"x47½" high.

2. NEW CONVERTIBLE OIL-GAS FURNACES ... New Economy for Suburban Homes

These furnaces are the ideal solution to the problem of many thousands of forward-looking home owners, builders and remodelers seeking the utmost flexibility in a practical, modern, automatic home-heating system for today . . . and *for years of tomorrows!*

Easily convertible with new Niagara Gas Conversion Burner.

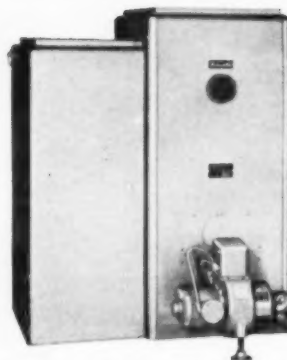
Exclusive Niagara rectangular heat exchanger permits exceptional compactness.

Available with or without burner hood which accommodates either gas or oil burner.

Also available in Down-Flow and conventional Hi-Boy models.

Sizes for large, medium and small homes.

WRITE for complete information.



Oil-fired AC unit. (Available also as gravity furnace — without blower-filter unit which is installable on either side.)

NIAGARA FURNACE DIVISION

The Forest City Foundries Co., 2500 West 27th Street, Cleveland 13, Ohio

HOME-HEATING EQUIPMENT MANUFACTURERS SINCE 1890



**GET STARTED
WITH**

Stainless
AND CASH IN
ON
Quality
BUSINESS



● Home owners and new home buyers are carefully shopping for **QUALITY** these days.

Builders are insisting on highest quality in sub-contractors' work.

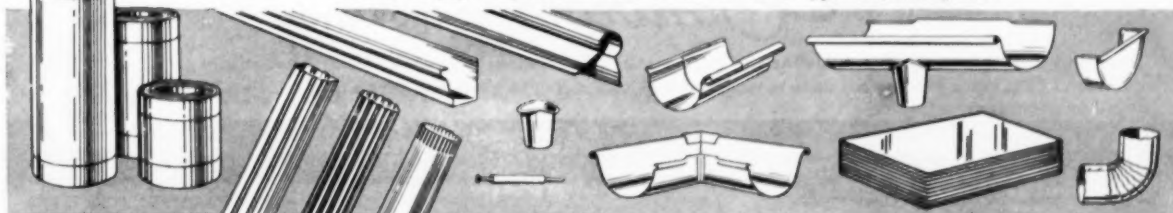
No better time for you to build a quality reputation—and no better way than by specializing in Berger Roof Drainage Products made of **ENDURO** Stainless Steel.

Installation requires no special tools or equipment. Simply solder with a larger, hotter iron than usual. Be sure to remove all flux immediately after soldering.

Ready-to-use Berger **ENDURO** Stainless Steel Roof Drainage Products are available now. Jobbers in most areas have them in stock. Ask your jobber, or write us for information. Then, get started with stainless steel and cash in on quality business.

BERGER MANUFACTURING DIVISION
REPUBLIC STEEL CORPORATION
1010 BELDEN AVENUE CANTON 5, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

include Snaplite Eaves Trough; "K" Gutter; Plain Round, Corrugated Round, and Corrugated Square Conductor Pipe; Ridge Roll; Flashing; Roll Valley; plus a complete line of all necessary fittings. All are made of 28-gage Republic **ENDURO** Stainless Steel, Type 430, dull finish.





What's Your Problem— **EXCESSIVE INVENTORY?**

Deal with
DETROIT!

One Compact
Yet Complete Line
Answers
Every Service Need!



How would you like to reduce inventory? Simplify ordering? Ease stocking and handling? Obviously, you would . . . and you can without reducing your ability to fill orders one iota! How? By simply following the lead of thousands of leading wholesalers and dealers who have answered these and other problems with **DETROIT** Controls. For with **DETROIT** Controls you handle one compact yet complete line that answers every heating need. That's because all **DETROIT** Controls, built by men who know your business, understand your problems, are designed for maximum adaptability and flexibility. **DETROIT'S** remarkable *Timed Cycling* Thermostat, for example, with its exclusive parallel heater gives you one thermostat for all jobs. As a result there is no choosing from a large assortment of heaters—no adjusting of variable resistors. In addition, all **DETROIT** Controls are quality-built of top quality materials to assure

long, continuous trouble-free operation. But why not find out for yourself? For complete information concerning the superior **DETROIT** line contact your nearest **DETROIT** wholesaler or write the factory direct.

Do You Know the **DETROIT V-579**



"BI-FLEX" GAS VALVE STORY?

Here is an absolutely quiet valve which is not only designed to function with natural, L.P., or sour gases, but also to function independently of gas pressure. Performance proven on thousands of installations this snap-acting, positive closing, "Bi-Flex" motor-actuated valve is famous for its reliable operation. Rugged and compact design makes it easy to install and service . . . compensated for changes in ambient temperature . . . $\frac{1}{2}$ " to $1\frac{1}{4}$ " sizes.


DETROIT Controls

ESTABLISHED AS **DETROIT LUBRICATOR COMPANY** IN 1877
CORPORATION

5900 TRUMBULL AVE. • DETROIT 8, MICHIGAN

Division of American Radiator & Standard Sanitary Corporation

Representatives in Principal Cities • Canadian Representatives in Montreal, Toronto, Winnipeg—Railway & Engineering Specialists, Ltd.



**AUTOMATIC CONTROLS for REFRIGERATION • AIR CONDITIONING • DOMESTIC HEATING • AVIATION
TRANSPORTATION • HOME APPLIANCES • INDUSTRIAL USES**

Serving home and industry — AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS



...starts your big selling season off with a bang!

AIMS hard hitting advertising campaign directly at tremendous new home and modernization market

If you sell furnaces, here's your opportunity to profit by one of the most concentrated promotional programs ever put behind any line.

Spearheaded by 3 big ads in the Saturday Evening Post, this hard-hitting campaign begins the last week in August with the September issue of American Home followed by Better Homes & Gardens, Home Modernizing, and Small Homes Guide. Five leading magazines will carry seven American-Standard SUNBEAM Warm Air Heating ads into 11,684,101 homes... telling about the advantages of American-Standard SUNBEAM furnaces and year 'round air conditioning units during the six weeks period when you make most of your sales.

This unusual magazine program alone is big enough to do a tremendous selling job for you. But, in addition, timely tie-in promotional material is available so that you can make the most of this big, concentrated warm air campaign.

Get ready now for a big warm air heating selling season. You've still got time to put in the stock you'll want, but you'd better hurry. For more information contact your wholesale distributor or write direct to us. Sunbeam Air Conditioner Division, American Radiator & Standard Sanitary Corp., Bessemer Building, Pittsburgh 22, Pa.



Plenty to sell

The American-Standard SUNBEAM line—including present best sellers and sensational new additions coming soon—gives you the best rounded array of top quality products on the market.

With the American-Standard SUNBEAM line, you'll have *everything* you need to get a big share of the warm air heating, summer cooling, electrostatic air cleaning, and conversion burner business in your community.

And, remember, when you handle the American-Standard SUNBEAM line, you're selling the best known name in heating. No line has greater public acceptance.

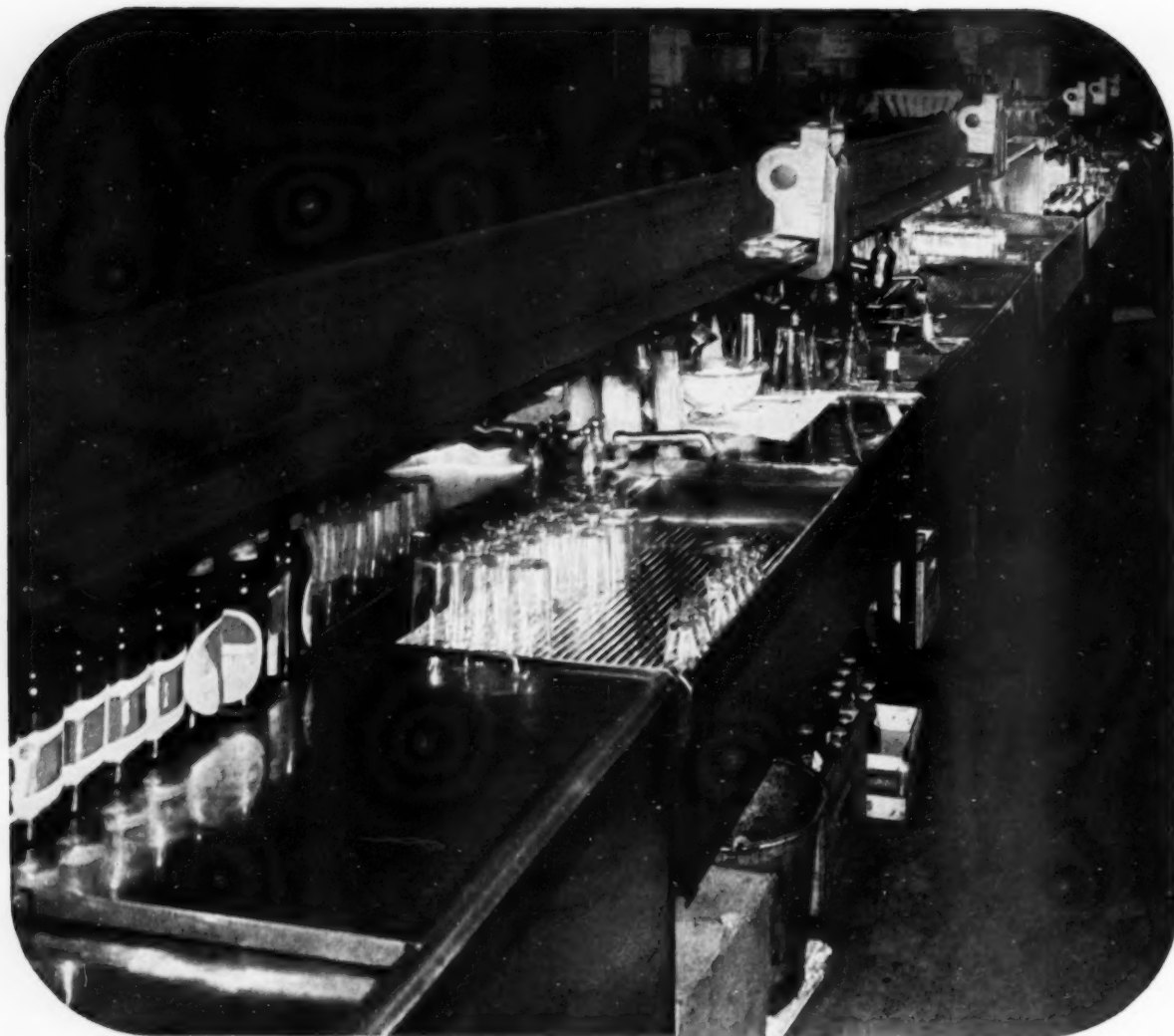


AMERICAN-Standard
SUNBEAM AIR CONDITIONER DIVISION

ELYRIA, OHIO

Executive Offices: Bessemer Building, Pittsburgh 22, Pa.

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS



It's hard to wear out ARMCO 17 STAINLESS STEEL

This Armco 17 underbar has been in service since 1937. In the 16 years that have passed, the tavern has changed management, decorations, furniture, bartenders and customers. But the Type 430 stainless steel bar hasn't changed much. It's about the same as when it was installed—except for a few scratches—and is good for many more years of service.

Type 430 is today's Stainless Steel

The nickel-bearing stainless steels, like 18-8, are still restricted. Because of this, chances are you'll be limited to Type 430 in these applications for some time to come. But you can use this chromium grade with complete confidence in restaurant, bar, kitchen and cafeteria equip-

ment. You can also bank on it for most outdoor service, except along the seacoast.

Build a "Stainless" reputation

Build your reputation as a fabricator of stainless steel with Armco 17, Type 430. It won't let you down. When you combine this quality material with quality workmanship you are planting the seeds for profitable repeat orders. Your Armco Distributor is ready to give you quick delivery of Type 430.

ARMCO STEEL CORPORATION

4113 CURTIS STREET, MIDDLETOWN, OHIO
EXPORT: THE ARMCO INTERNATIONAL CORPORATION





avoid trouble and complaints

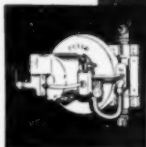
Contractors and Engineers **KNOW**
they can depend on

Petro

OIL BURNERS

Industrial Oil Burners

Rotary type. Burn low-cost, heavy fuel oil with complete reliability. Models for every industrial need. Capacities up to 200 gals. per hr.

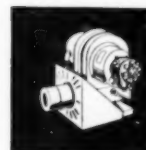


Combination Oil-Gas Burner

This commercial industrial burner is the answer to seasonal fuel shortages. Makes possible advantages in economical fuel buying.

Residential Furnaces and Boilers

Made in popular sizes to fit the heating needs of homes from 4 to 10 rooms. Extremely compact and attractive. Real fuel savers.



Conversion Units

Efficient, trouble-free oil burners for home and commercial use. Capacities up to 20 gals. per hr.

Horizontal Furnace
Hang it or hide it—this winter air conditioner fits anywhere. Available in 5 models from 80,000 to 180,000 Btu's (output at bonnet).



Specialists in oil heating for 50 years

Complete Line

There's a size and type of Petro oil burner, or home furnace or boiler, to fit every oil firing need. The name Petro, since 1903, has been known and respected wherever oil burning equipment is used.

Simple, Dependable Operation

Petro oil burners cost the plant operator or homeowner less to own and operate because their performance is proved and simple. The fine reputation Petro equipment enjoys, and its popularity with owners, is the result of this simplicity and traditional dependability.

Easily Installed

Petro oil burners are compact and well built. Heavy mounting flanges, protected wire connections, easy access to oil and ignition lines, are all features which help make Petro oil burners the favorite of contractors and dealers all over the nation. They save installation time—they cut service calls.

Get Latest Information

Illustrated literature and specification sheets gladly sent free. Write Petro, 3244 West 106th Street, Cleveland 11, Ohio. In Canada: 2231 Bloor St., West, Toronto, Ontario.

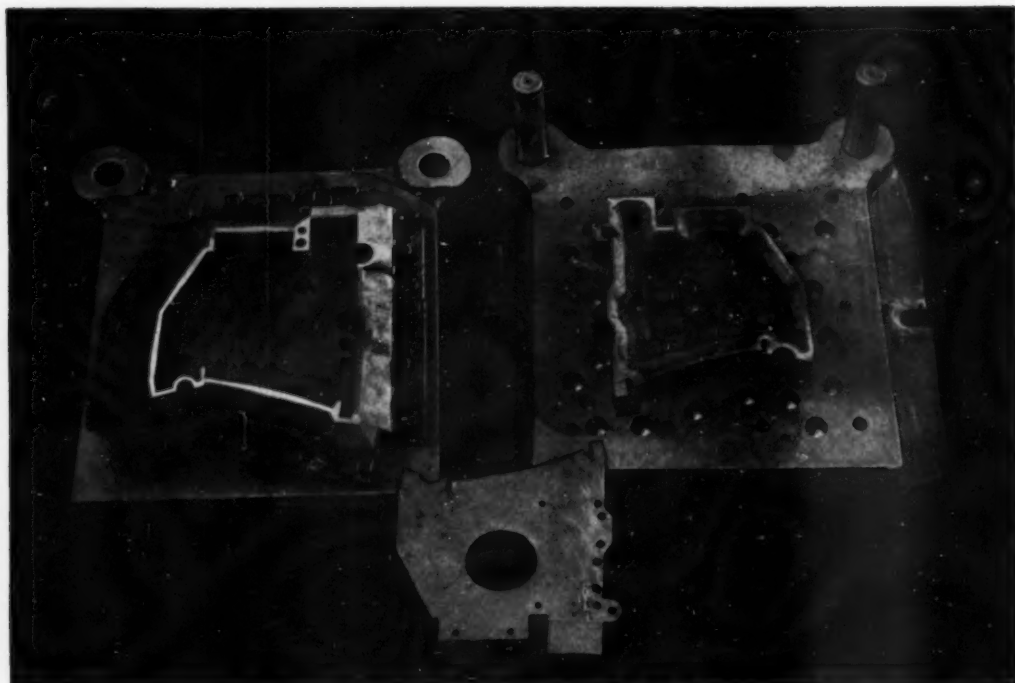
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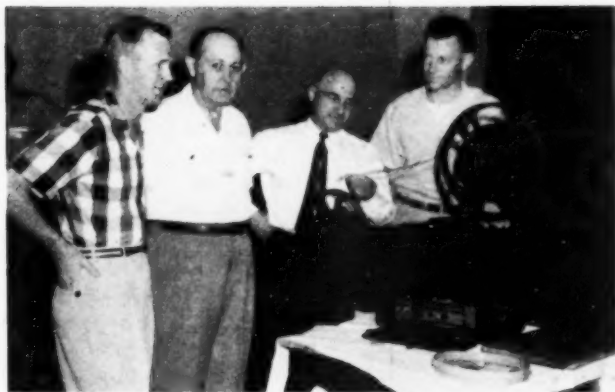
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MEMBERS OF THE convention committee check with Henry Voegeli (third from left) about the details of a film on copper roofing. They are (l to r.) Marvin Kelly, W. M. Jones, Sr., and Hugh Jenkins



NEW CONTRACTOR MEMBER, Warren W. Sims, Thomson, Ga., (right) receives his code of ethics from B. L. Noblitt, secretary

SELL BENEFITS —

(Continued from page 93)

predominating type of structure throughout Georgia, and that the use of small round duct buried in the slab was the most economical way of distributing air from a central system. He did suggest that duct sizes not be restricted to the 4 in. size, but that 5 in. duct should be used for any supply that required Btu capacities nearing the upper limits of the smaller duct range. Mr. Thompson also recommended that ductwork be insulated for the first 10 ft after it leaves the furnace bonnet. This, he feels, will prevent the concentration of heat in the slab floor around the furnace — an area where it is needed less than any other place.

L. B. Crawford, Owens-Corning Fiberglas Corp., outlined a procedure for attaching insulation to round duct and pointed out that insulation is essential in all heating installations because it assures delivery of the estimated quantity of heat to the duct outlet. The added cost, he said, is soon offset by the savings in fuel. He recommends that insulation be installed on round ducts by first applying adhesive in 4 in. widths to the duct, and spacing the adhesive bands about 1 ft apart. Then 1 in. flexible duct insulation is used to wrap the duct and when the wrapping has been completed, the insulation is secured with a strong twine that has been half hitched every 6 in. This method of installation reduces application costs.

Will Price Changes Affect Sheet Metal Man?

A sheet metal panel gave contractors some answers relating to new products, the effect of the recent price increases on existing work orders, relations between contractors and distributors, new sheet metal tools and machinery, use of acetylene and electric welding for sheet metal applications, and new uses for stainless steel, brass and copper.

The panel was made up of men representing manufacturers and wholesalers. They were: W. A. Babb,

Potts-Farrington Co.; Barto Brown, Arnold Brown Co.; T. G. Buchanan, J. M. Tull Metal & Supply Co.; D. C. Gager, American Brass Co.; Grant Gillespie, Cincinnati Elbow Co.; H. H. Herring, Chase Brass & Copper Co.; Victor Johnson, Southern States Iron Roofing Co.; R. W. McGarity, J. M. Tull Metal & Supply Co.; Ned Murphy, Conklin Tin Plate & Metal Co.; N. D. Roberts, Atlantic Sheet Metal Co.; and Henry Voegeli, American Brass Co. The panel moderator was I. C. Mock, sheet metal contractor of Augusta.

The general response to questions asked from the floor indicated that sheet metal contractors must expect the increase in steel prices to be passed along to them, and that they in turn will have to pass along these increases to the consumer. In regard to sheet copper, it was felt that if any price change occurred it would be a slight decrease. Members of the panel suggested that contractors should try to have sufficient sheet metal stock on hand to cover the needs for a 30 day period; in this way, price increases or decreases would not materially affect the capital invested in stock.

Many new models of equipment such as shears, slitters, angle iron cutters and portable tools were discussed. Contractors who had purchased the new models were well pleased with their performance and with the reduction in labor that most of them provided.

Officers Elected

One of the primary subjects discussed at the business meeting was the employment of a full time executive secretary, whose name will be announced shortly by the governing board.

Officers elected for the coming year are: I. C. Mock, president; Leroy Still, vice president; Hugh Jenkins, secretary-treasurer. Directors are: Albany, Charles Sapp; Athens, L. H. Bailey, Jr.; Atlanta, Howard Brown and Wendell Townsend; Augusta, A. L. M. Amphlett; Columbus, L. D. Herndon; Macon, Charles Bryan, Jr.; Rome, Jas. M. Brown; Savannah, W. G. Clark, Jr.; Valdosta, James H. Welch.



THE FUN INCLUDED learning local "manufacturing processes" (l. to r., James Crombie, Mel Carnahan, and John Robertson) . . .



EARLY MORNING GOLFING (l. to r., H. R. Coile, R. G. Dawley, Mrs. G. D. Guler, W. J. Baak, and G. D. Guler) . . .



AND LADIES' BRUNCH get-togethers (l. to r., Mrs. C. C. Kanner, Mrs. G. F. Wheelock, Mrs. A. M. Vorys, Mrs. W. H. Bowe, Mrs. C. L. Schilling, Mrs. W. H. Abbenzeller, Mrs. A. L. Thys, and Mrs. W. F. Fox)

"GET INTO COOLING" —

(Continued from page 82)

Williamson Heater Co.; E. P. Hayes, vice president, C. A. Olsen Mfg. Co.; E. A. Nash, merchandising manager, Airtemp Div., Chrysler Corp.; and H. R. Nielsen, sales manager, Air Conditioning Div., Servel, Inc.); two members of the trade press (Clyde Barnes, editor, *American Artisan* and E. A. Scott, Jr., editor, *Sheet Metal Worker*); and one research engineer (W. H. Harris, Professor of Mechanical Engineering, University of Illinois). The forum was moderated by C. S. Rambo, executive secretary of the association.

Dealer Training Urged

The panel further recommended that the wholesaler engage an engineer with an air conditioning background and build the summer cooling department around this man. Wholesalers were urged to establish a dealer training program that would meet at regular intervals throughout the year and would emphasize merchandising techniques, engineering, good installation practices and service procedures.

It was pointed out that the wholesaler could obtain much of the help needed for such programs from the manufacturer, who can provide specific information relating to his product, both from a selling and service point of view. The manufacturer is also in a position to help the wholesaler to tie his merchandising campaign in with nationwide advertising.

Cooling Means Steady Volume

It was agreed that the residential cooling field will be one of the major factors permitting the heating industry to level off its annual business volume so that there will be less variation between peak demands and periods when business has slowed to the yearly minimum. Thus the wholesaler will be in a better position to keep a constant staff of employees who know his business policies and who can work more efficiently the year 'round. It was also pointed out that the wholesaler should make his entry into the cooling field by



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careful steps and not expect to make a profit on this department for the first year.

At the conclusion of the forum, several members reminded the wholesalers that residential air conditioning will pass through practically the same phases of development as did forced warm air heating in its early years of acceptance. But once the pattern has been established, the heating wholesaler will find himself in the year 'round comfort business.

Other business on the agenda consisted of reports from various committees and board meetings.

Hold Dance and Golf Match

When these sessions had been completed, the wholesalers, their wives and guests relaxed in many ways. There were swimming, fishing, horseback riding, tennis, shuffle board and

hiking to choose from, but the two highlights of the social activity were an old fashioned barn dance, with prizes being awarded the best dancers, and a golf tournament, with prizes for low net scores (based on a graduated handicap system). The ladies program included a tour of the famous Biltmore estate, a trip to Mount Mitchel (highest mountain east of the Mississippi), a putting contest, shuffleboard, and daily card parties.

Winners of the barn dance contest were:

Mrs. A. L. Thys, Birmingham, Ala.
Mr. A. M. Vorys, Columbus, O.
Mrs. Fred R. Green, Des Moines, Ia.
Mr. Tom Byrd, Dayton, O.

Prizes for the best hillbilly costumes went to:

Mrs. Gail C. Mason, Dearborn, Mich.
Mr. Gail C. Mason, Dearborn, Mich.

Mrs. W. H. Abbenzeller, Toledo, O.
Mr. P. C. Pfriem, Cincinnati, O.

Golf prizes were awarded as follows:

Low Net for Wholesalers —

A. G. Earnshaw, Earnshaw Sheet Metal Supply Co.

Low Gross for Wholesalers —

C. Ed Smith, Smith Furnace Co.

Low Net for Manufacturers —

Jack Green, Viking Air Conditioning Corp.

Low Gross for Manufacturers —

R. G. Dawley, Norman Products Co.

Plan for Annual Meeting

The annual convention scheduled to be held December 7-8-9 in Chicago at the Conrad Hilton Hotel was discussed and an outline of the program was taken under consideration and is to be passed along to the program committee when it has been appointed.

WHEN IS DEALER LIABLE? —

(Continued from page 102)

inflicting the injury. The circumstances were entirely outside the control of the injured person but completely within the control of the one whom the court in each instance held responsible for the loss or injury.

Injured Person Need Not Prove Negligence

A famous negligence case decided in the middle of the last century has been frequently followed as an authority in the application of this rule.

A man passing along the street was hit by a barrel of flour falling from a warehouse window facing the street at that point. The court in its decision said:

"It is the duty of persons who keep barrels in a warehouse to take care that they do not roll out and I think that such a case would beyond all doubt afford evidence of negligence. A barrel could not roll out of a warehouse without some negligence and to say that a man who is injured by it must call witnesses from a warehouse to prove negligence seems to me preposterous.

"So in the building or repairing of a house, if a person passing along the road is injured by something falling on him, I think the accident alone would be evidence of negligence. Or if an article calculated to cause damage is put in a wrong place and does mischief, we think that those whose duty it was to put it in the right place are responsible, and if there is any state of facts to rebut the presumption of negligence, they must prove them."

Negligence Not Necessarily Presumed

This rule in these cases becomes more apparent when

contrasted with another case, in which the cause was unknown but no negligence of any sort was established. A railroad "ride" at a beach was equipped with open, uncovered cars run by gravity from a high point to which the cars were hoisted. A 150 ft long tunnel through which these cars ran completely hid the passengers from observation. The occupant of one of these cars was seen entering the tunnel. Later the car appeared without the passenger, who was found unconscious in the tunnel with a wound in his head.

In the suit brought by this injured man, seeking to hold the proprietor of this railroad liable for the damages, the court stated:

"There are instances in which the circumstances surrounding an occurrence are held, if unexplained, to indicate the existence of negligence as the cause of the injury.

"These are instances where the doctrine is that the circumstances attendant upon the accident are themselves of such a character as to justify inferring negligence as the cause of that accident. But the doctrine does not go to the extent of implying that we may, from the mere fact of an injury, infer what physical fact produced that injury."

A few years ago, a cargo of gasoline in a tractor trailer burned on a highway and the tractor owner was sued by the state for the damage. The cause of the fire was unknown. The supreme court in that state said in its decision holding that such facts, unexplained, failed to show negligence. "It is of course elementary that negligence is not to be presumed from the mere happening of an accident."

[Notes: While this discussion applies to actual cases, it should be remembered that legal rules vary in different states.]

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(Fig. 8). Both types of construction have a basic U factor of 0.09 Btu per hr per sq ft per deg F. This factor is, therefore, entered in the U factor column opposite item 9 (Fig. 4). Since we already have calculated our areas, it remains but to multiply out each area by its appropriate heat gain factor and U factor in order to obtain the final heat gain in Btu per hr.

Occupancy Load Variable

Reference to paragraph 4-40 on page 19 of Manual 11 informs us that on the average we can expect certain occupancy loads to prevail in certain types of rooms. This obviously is not a hard and fast rule, since occupancy loads will tend to vary depending not only upon the size of the home but upon the living habits of its occupants. We also have conditions where people are moving about within the house from room to room. Experience has shown that, on the average, we should figure our loads as though occupancies actually were as shown in the table in paragraph 4-40. By so doing, we will avoid any possibility of embarrassment in not having provided sufficient cooling to care for at least a substantial part of the total occupancy load which, under normal conditions, may be expected to occur in any one room at a given time. Accordingly, if we provide for two people in the dining room through the greater part of the day, we will probably store up enough reserve cooling effect to take care of a temporary gathering of four, five or possibly even six people at the dinner hour without causing any serious unbalance in the overall comfort level of the combination dining room-living room area.

Since the living and dining rooms actually are combined into a single large room, we add together our occupancy recommendation of two for the living room and two for the dining room, as shown in paragraphs 4-40, and record a total occupancy of four opposite item 10 on our heat

gain calculation worksheet (Fig. 4). The recommendation for the kitchen is two, and this we add in the worksheet. We proceed in this same way across the sheet, room by room, taking note of the recommendations in paragraph 4-40 which tell us to omit occupancy loads in the bathroom, hall or the den. On the average, a full grown human being will give out about 300 Btu per hr of sensible heat under normal conditions. Therefore, in order to obtain a figure for the occupancy load in Btu per hr per room, we multiply the estimated number of occupants by 300. In this way, we get an estimated occupancy figure of 1200 Btu per hr for the living-dining room combination, 600 for the kitchen and 300 for the master bedroom, etc.

We now add up for each room each of the individual Btu per hr heat gains entered under items 6, 7, 8, 9 and 10 of the heat gain calculation worksheet and record these totals opposite item 11. For our sample home, the sum total of these individual room heat gains comes to 25,193 Btu per hr, shown as item 12.

Estimating Other Loads

Paragraphs 4-43 through 4-46 on page 20 of Manual 11 point out that no matter how tightly constructed a building may be, warm air from the outside is bound to leak into the structure over a period of time. This occurs not only as a result of the periodic opening and closing of doors as people pass in and out of the structure but also as a consequence of very minute leakages at the multitude of tiny cracks and joints which exist all over the outer surface of any building. These paragraphs also clearly point out the extreme difficulty (due to wind variations and the vast number of minute openings, etc., which must be considered) in estimating accurately the amount of heat gain due to ventilation causes. Paragraph 4-46, however, offers a single factor of 0.15 times the total sensible heat gain (item 12, Fig. 4) as being sufficiently typical for all practical purposes. Using this factor, we get an estimated

ventilation load of 3779 Btu per hr. This figure is entered as item 13.

In our preceding calculations, we have taken into account only sensible (that is, "dry") heat gains. Industry experience has shown that latent heat gains in the average residence will approximate 30 per cent of the total sensible heat gains. While it is true that minor variations above and below this percentage will occur at various points through the United States, depending upon climatic conditions, the amount of difference for all practical purposes is usually found to be negligible. Using this reasoning, we multiply our total sensible heat gain, 25,193 Btu per hr, by a factor of 0.30 (or roughly 30 per cent) in order to obtain a dehumidification, or "latent" heat load of 7558 Btu per hr. This is inserted as item 14.

At item 15, we enter the total of the individual loads itemized in items 12, 13 and 14 of the heat gain calculation worksheet, to arrive at a grand total cooling load of 36,530 Btu per hr, or very slightly over 3 tons. We select our cooling equipment on this basis.

Sizing the Ducts

Using the individual room heat gains recorded as item 11 of the worksheet, we can refer to Tables 15, 16, 17, 18, 19 and/or 20 to size and locate our ducts and registers, depending upon the type of system selected for installation in this home. This data may be conveniently entered in the blanks provided at the lower right hand side of the heat gain calculation worksheet.

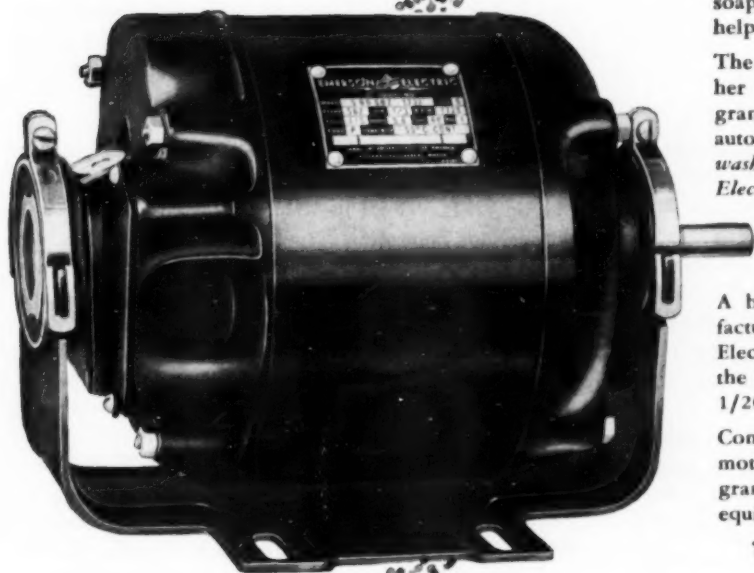
It is conceivable that one or more rooms, due to exceptional glass areas, etc., might have their peak loads occur at some time other than that on which the preceding calculations are based. In such cases, it is advisable, before sizing the ductwork to these rooms, to recalculate the individual cooling load for these rooms for the time of peak load. These latter (larger) values should be used to size the ductwork in order to insure that an adequate volume of cool air can be furnished to each room under peak cooling load conditions.



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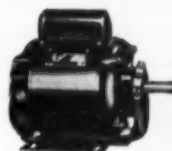
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REVERSE TRANSITION ELBOW —

(Continued from page 88)

place when the various patterns for the fitting are laid out.

To Construct the Flat Side, Fig. 3:

(a) Draw an extended horizontal line and establish the point V. From V measure 2 in. and establish the point U. From U measure 1 in. and establish point T.

(b) From T draw an extended line at 90 deg to line VT. With T as center and radius 1 in., draw a 90 deg arc and establish the point S. From S measure 1 in. and mark the point P.

(c) With U as center and radius U-V, draw a 90 deg arc and mark the point X. Draw the line X-P. Bisect the arc V-X and establish the point W.

(d) Draw the work lines A, B, C, E, F, and N. Bisect the arc U-S and through the points draw a line perpendicular to line N to intersect the arc U-S. Mark the line Y.

To Lay Out the Back Pattern, Fig. 4:

(a) Draw the horizontal line V'-Z', 1 in. From V', draw an extended line perpendicular to V'-Z'.

(b) Multiply the given 2 in. radius shown on Fig. 3 by the constant 1.57. Thus, 1.57×2 equals $3\frac{1}{8}$ in. From point V' measure $3\frac{1}{8}$ in. and mark the point X'. From X' measure 1 in. and mark the point P'.

(c) From points V' and P' draw lines perpendicular to line V'-P'. From point P' measure 2 in. and mark the point O'. From point V' measure 1 in. and mark the point Z'. Draw the line Z'-O'.

(d) Bisect the $3\frac{1}{8}$ in. distance V'-X', and establish the point W'. From this point, draw a line perpendicular to line V'-P' to intersect line Z'-O' at 1'. From point X', draw a line perpendicular to line V'-P' to intersect line Z'-O' at 2'.

(e) From point Z', draw a line perpendicular to line V'-Z' to intersect line W'-1', and mark the difference in length between lines V'-Z' and W'-1' with the letter G. From point 1' draw a line perpendicular to line W'-1' to intersect line X'-2' and mark the difference in length between lines W'-1' and X'-2' with the letter H. Draw a line through point 2' perpendicular to line X'-2' to intersect line P'-O' and mark the difference in length between lines X'-2' and P'-O' with the letter K.

To Lay Out the Throat Pattern, Fig. 5:

(a) Calculate the length of the straight side by multiplying the given radius by the constant 1.57. Thus, $1.57 \times$ given radius 1 in. equals $1\frac{9}{16}$ inch.

(b) Draw the horizontal line 3'-4' which is 1 in. From point 3' draw a line perpendicular to line 3'-4'. Working from point 3' measure the calculated length $1\frac{9}{16}$ in. and mark the point 5'. From 5' draw a line perpendicular to line 3'-5'. Measure 2 in. and mark the point 6'. Draw the line 4'-6'.

(c) From point 4' draw a line perpendicular to line 3'-4' to intersect line 5'-6' and mark the difference in length between lines 3'-4' and 5'-6' with the letter L.

To Develop the Offset Side Pattern Marked Fig. 6:

(a) Draw the 2 in. horizontal line marked Z-3. Transfer line B from Fig. 3 to the vertical leg of a right angle and distance G from Fig. 4 to the horizontal leg. The hypotenuse B-G is the true length line. With point 3 on Fig. 6 as center and radius B-G draw an arc. Draw a right angle, transfer line A from Fig. 3 to the vertical leg. From Fig. 4 transfer distance G to the horizontal leg. The hypotenuse A-G is the true length line. With point Z on Fig. 6 as center and radius A-G cut the arc which was made using B-G as radius, and mark point 1.

(b) Transfer line C from Fig. 3 to the horizontal leg of a right angle and distance M from Fig. 4 to the vertical leg; the hypotenuse M-C is the true length line. With point 1 on Fig. 6 as center and radius M-C draw an arc. Draw a right angle; transfer line N from Fig. 3 to the vertical leg and distance L from Fig. 5 to the horizontal leg. The hypotenuse N-L is the true length line. With point 3 on Fig. 6 as center and radius N-L, cut the arc which was formed using M-C as radius. Mark point 5.

(c) Draw a line connecting points 3 and 5 and mark the line N-L. Find the center point on this line, and through the point draw a line perpendicular to line N-L. From Fig. 3 transfer distance Y to the perpendicular line on Fig. 6, placing one end at the intersection of line N-L and the perpendicular. Label the line Y', and mark its other end (farthest from line N-L) as point 6. Bisect the distance 3-6 and through the arcs draw an extended line. Bisect the distance 6-5 and through the arcs draw a line to intersect the line that bisects line 3-6. Mark the point of intersection R'. With R' as center draw an arc through points 3, 6, and 5.

(d) Length E is transferred from Fig. 3 to the vertical leg of a right angle and distance K is transferred from Fig. 4 to the horizontal leg. The hypotenuse K-E is the true length line. With point 5 on Fig. 6 as center and radius K-E, draw an arc. With developed line A-G as radius and point 1 as center, cut the arc which has been formed using K-E as radius. Mark the point 2.

(e) Transfer distance F, Fig. 3, to the vertical leg of a right angle, and distance K, Fig. 4, to the horizontal leg. The developed line K-F is the true length line. With point 2 on Fig. 6 as center and radius K-F, draw an arc. With a 1 in. radius and point 5 on Fig. 6 as center, cut the arc which has been formed using K-F as radius. Mark the point of intersection O.

(f) Bisect the lines A-G and through the arcs draw lines to intersect at point R''. With R'' as center, draw an arc connecting points Z, 1, and 2. Draw lines connecting point 2 to O and 5 to O.

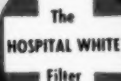
(g) Draw the working brake lines connecting point 3 to 1 and 1 to 5.

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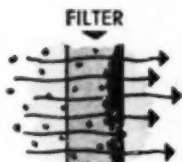


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Please send me complete information on AMER-glas Replaceable Air Filters. Show me proof of the profits!

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COMPANY MAIL THIS TODAY

ADDRESS _____

CITY _____ ZONE _____ STATE _____

COOLING CONTROLS —

(Continued from page 69)

quired to maintain a desired temperature level.

Tying in the Cooling Tower

In the basic control systems discussed so far it has been assumed that unit condensers are either air cooled or water cooled by city water. A very common addition to air conditioning systems today is the cooling tower. This device is required to conserve water and to prevent the overloading of municipal systems.

For automatic control, the tower pump (and fan in mechanical draft towers) must be interlocked with the air conditioner control circuit. A convenient way to do this while at the same time providing assurance that the tower is operating properly before the compressor starts is shown in Fig. 4. Here the room thermostat

starts and stops the tower in response to temperature. Whenever the tower starts, its pump builds up pressure in the condenser water circuit, closing a pressure switch and starting the cooling unit. When the thermostat is satisfied, the tower pump and fan are stopped. Pressure in the water line drops, the pressure switch opens and the compressor stops.

When Cooling Is Added

For the residential installation where a cooling unit is added to a warm air furnace, it is necessary to tie the heating fan into the control circuit for the cooling unit. A simple way to do this is shown in Fig. 5. The air conditioner shown happens to be a multiple system unit comprising two complete 1 hp cooling units. Thermostatic control is direct, by means of a horsepower rated two-step return air thermostat. The furnace fan runs continuously whenever the

selector switch is in the "cool" position. This is accomplished by having the switch "short out" the furnace fan control which operates the fan in the heating season.

In keeping with the aim of this series of articles, the control schemes discussed are fundamental. The possible variations and refinements are almost infinite in number. The design of each new control brings a challenge to the designer to make use of the new features. However, control systems should never be made more complicated than required. A control system that is loaded with refinements which add nothing to the acceptability of the air conditioning system is quite frequently worse than useless. Controls are delicate instruments. The more of them there are, the more difficult becomes the job of maintaining them, and the more likely becomes the possibility of failure or improper adjustment.

[The article scheduled for the September issue in this series on residential air conditioning will cover the various electrical controls mentioned in this article. The function of the individual control, its operation and adjustment for summer cooling applications will be given in detail.]

WORK FOR SHEET METAL MEN —

(Continued from page 96)

tractors has asked that congress pass the Federal Constructors Contract Bill which is intended to curb the general contractor who invites bids from subcontractors and then "shops" these bids, trying to get lower and lower prices.

"Subcontractors do not believe bid-shopping can be stopped by individual ethics, or by the slow process of education. We believe it can be stopped only by a law which compels the unethical general contractor to name his subcontractors and the amounts of their bids," Mr. Stromberg said.

Selling Quality Work

Wayne S. Miller, Greensboro, N.C., warm air heating dealer, told members how he "sells quality" to his customers in the face of lower bids by other dealers. He said, "I try to impress my prospect with the fact that I know what I'm doing and that I'm not going to suggest he buy something other than what he needs. My first step is to draw a plan of the building, if one isn't available — showing dimensions and other important data. Then I work up a heat loss estimate showing each room and the Btu needed to maintain comfort during cold weather. I use these two items as sales tools. They seem to create

confidence in the work I propose, and do not 'confuse' the prospect, as many dealers believe."

The Warm Air Dealer and Cooling

Summer cooling was the predominating subject of a panel discussion participated in by C. L. Horn, R. J. Foster, W. S. Miller, Joe Bell and Ed Long, and moderated by V. D. Ramseur, Jr. Heating dealers were asked to write questions directed to the panel and relating to problems they had encountered.

In regard to summer cooling, the conclusion of most panel members was that the warm air heating dealer must assume the responsibility of making residential cooling installations. As Mr. Horn stated, "The day of the warm air heating dealer is past; it is now the era of the air conditioning dealer — the man who can provide comfort during both summer and winter."

Officers Elected

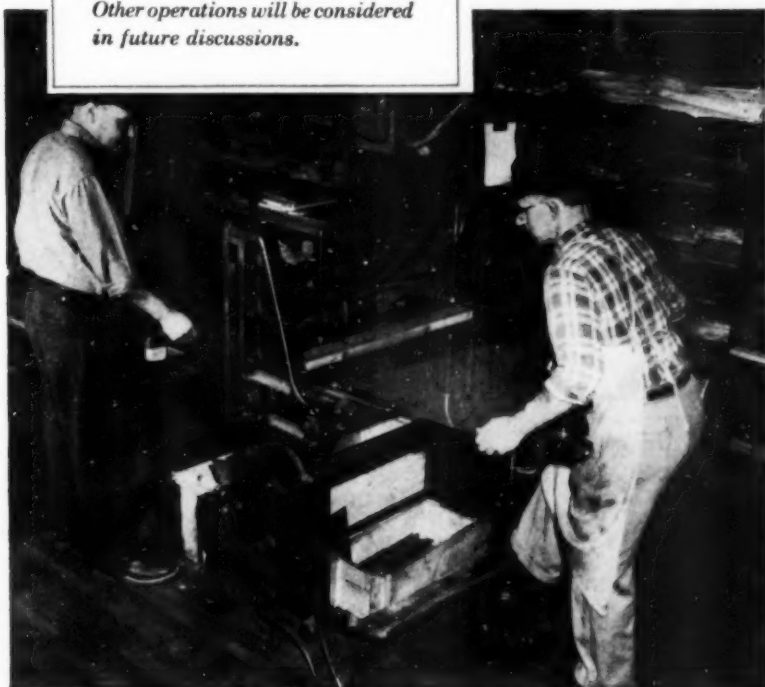
Officers elected for 1954 term are: W. T. Fort, president; Rudy Barnes, first vice president; W. R. Hartin, Jr., second vice president; and J. M. McKeithan, secretary and treasurer. Directors are: John Stanley, Lokie Martin, E. L. Scott, G. A. Stewart, M. A. Apple, Beverly Rose, J. Roy Martin, Jr., George De Lay, and James Barger.

The 1954 convention is scheduled to be held June 17 to 19 at the Grove Park Inn, Asheville, N. C.

SOME ANSWERS TO YOUR SHOP QUESTIONS ON

cold cutting straight-chromium Stainless Steels

This is another in a series of advertisements discussing the straight-chromium grades of Stainless Steel from the standpoint of fabricating performance. Other operations will be considered in future discussions.



Type 430 Stainless Steel sheets sheared for use in TOASTMASTER Roll and Food Warmers

Shearing 18 and 24 gage sheets is the first step in fabrication of the famous Toastmaster line of restaurant Roll and Food Warmers from Type 430 Stainless Steel.

McGraw Electric Company, Elgin,

Ill.—which manufactures these products—reports no difficulty in shearing the Type 430 Stainless sheets or in any of the fabricating operations which follow, including punching, forming, blanking and spot welding.

COLD cutting operations with straight-chromium Stainless Steel present no special problems to the fabricator who keeps this thought in mind: it takes more power to cut Stainless Steel than an equivalent gage in mild steel.

As a general rule, a shear should have a capacity in mild steel four to five gages heavier than the Stainless being sheared. Resembling carbon steel in performance, straight-chromium grades have a tendency to "break out" sooner than nickel-bearing grades.

This same characteristic holds true in blanking and punching, and clearances should be held about the same as for plain carbon steel. Blanking and punching dies should be of the best grade of tool steels.

In perforating straight-chromium grades, punches should be set as for plain carbon steel and more power should be used. It is not advisable to attempt to perforate straight-chromium grades if the holes are smaller in diameter than the thickness of the stock.

Our representatives will be glad to help you with any problems that you may encounter in using U.S.S. 17 (Type 430) Stainless Steel and any of our other straight-chromium grades.

UNITED STATES STEEL CORPORATION, PITTSBURGH • AMERICAN STEEL & WIRE DIVISION, CLEVELAND • COLUMBIA-GEORGE STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. • UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS • STRIP • PLATES • BARS • BILLETS • PIPE • TUBES • WIRE • SPECIAL SECTIONS



UNITED STATES STEEL



Behind this

ECONOMY
name...

INTERNATIONAL HEATER CO. UTICA, N.Y.

It takes a complete line to complete every sale! And that's just what International Economy offers you — a complete line of the most modern heating equipment for gas, oil or coal! In the great, new I E line, you have more models, more features, more profit possibilities than ever before:

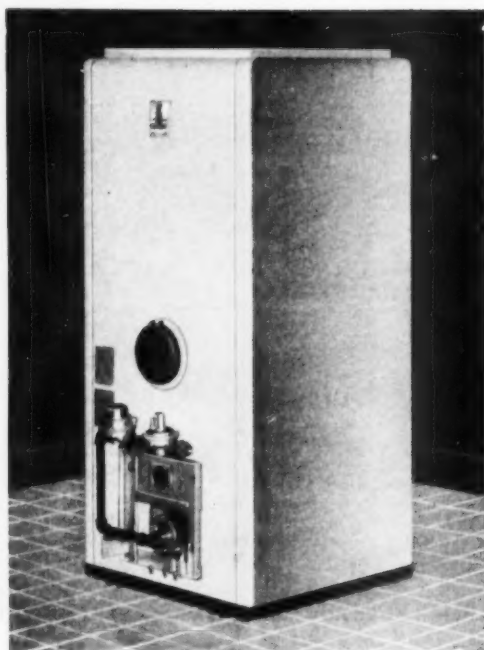
- Smaller sizes assembled
- 10-year warranty
- AGA approval
- Underwriters' Laboratories listing
- Easily convertible
- With or without vestibule

And you spend less time selling the job, too — because your customers know and trust International Economy — famous for the finest for more than 110 years! See for yourself — see your International Economy distributor — let him show you the way to more satisfaction for your customers — more profits for you. If you don't know his name, write us for catalog and full details . . .



ENGINEERED FOR THE FUEL YOU WANT TO USE

Ask about our
DEALER PROMOTION PLAN
— a proven sales program that will produce more year-round heating profits for you.



MODEL GG-82E, Gas-Fired Gravity Furnace —

one of more than 70 models in the International Economy line. Fully tested and approved, assembled at factory, ready for fast, easy installation. Like all International Economy units, this furnace carries our 10 YEAR WARRANTY — a guarantee of top performance!



See your distributor — or write
Dept. A-8 for catalog and details:

**International
heater co.
utica 2, n.y.**

Western Office and Warehouse — Chicago, Ill.

A model and size for every home, every type of fuel . . .



the 3rd. DIMENSION



May be the difference
Between PROFIT and LOSS

Here's how *MicroRold*® Stainless
Steel Saves You Money

The third dimension, or gauge thickness, is extremely important in the purchase and use of stainless steel. Job costs are figured on a square foot of stainless area basis while stainless sheets are purchased on a weight basis. Each one-thousandth inch saved in thickness saves 1.26 pounds per sheet.*

When sheets are ordered by gauge number, the permissible A.I.S.I. variation in thickness is plus or minus 10%. Thus, if you order 18 gauge you may receive sheets .052" thick, when a thickness of .0475" would suit your purpose. Using a standard

*36" x 120" standard size sheet.

18 gauge 36" x 120" sheet as an example, the theoretical weight is 63.00 pounds, but this weight could permissibly vary between 59.22 pounds and 65.52 pounds.

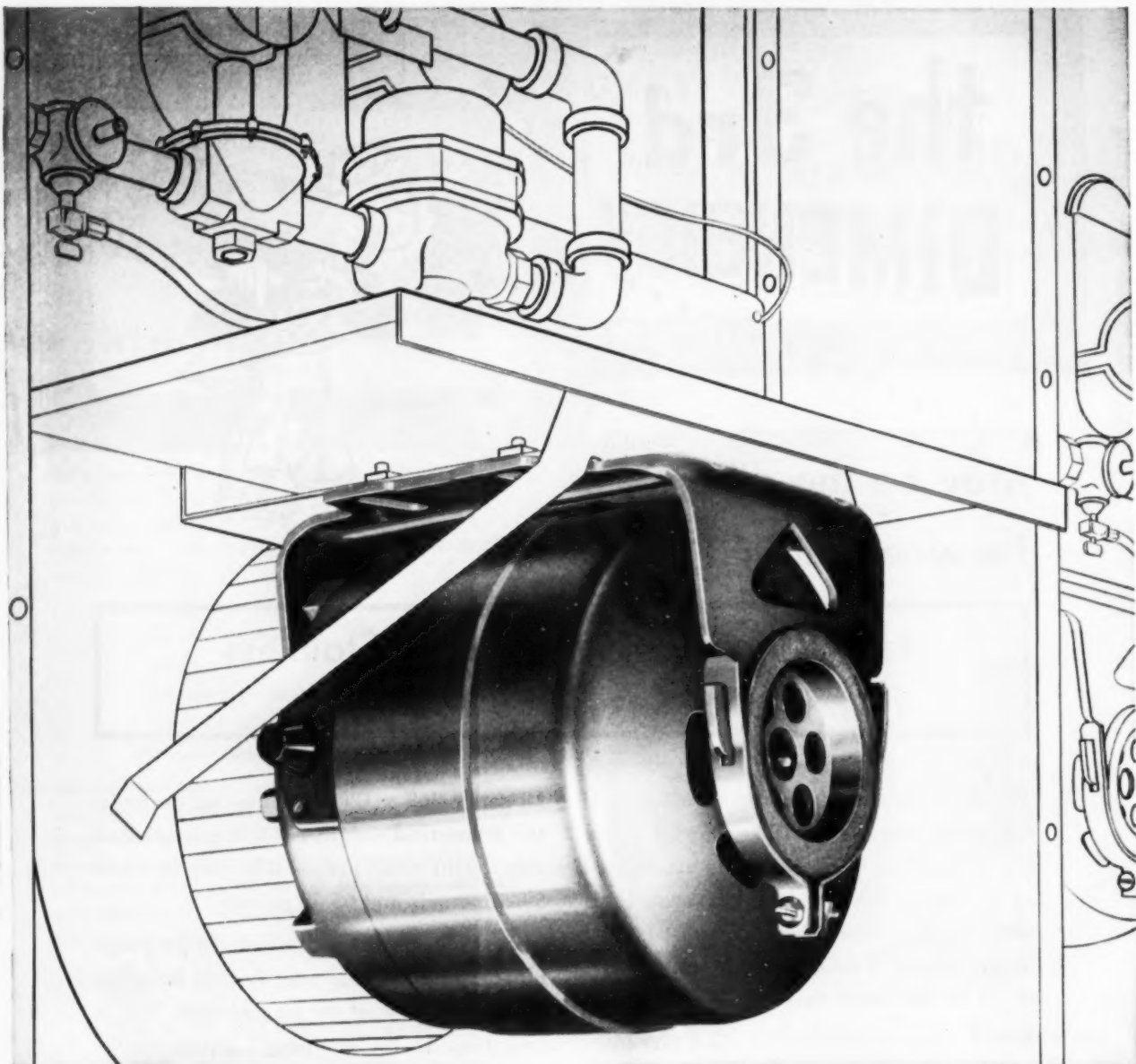
MicroRold sheets may be ordered by gauge number and you may specify they be rolled on the light side of the gauge range. This is true because the company's equipment is such that more accurate control of thickness is possible.

If you are not a user of MicroRold sheet it will pay you to get the full details. Your steel warehouse distributor will gladly tell you the MicroRold story.

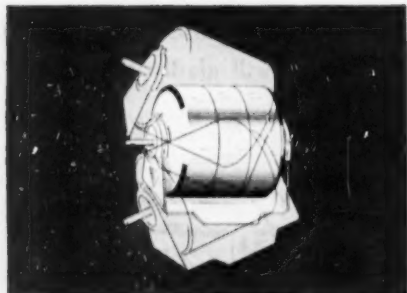
WASHINGTON STEEL CORPORATION

Washington, Pennsylvania





Here are SIX good reasons why your product



1 VERSATILE all-angle unit bearing design and sealed-in lubrication system permit motor to be mounted in any position.



2 ATTRACTIVE APPEARANCE of motor improves the appearance of your product in applications where the motor will be visible.



3 MOUNTING CONVENIENCE helps solve product design problems. Use resilient cradle-base or end-ring mounting.

This motor drives a furnace fan...

G-E Shaded Pole Motors Can Help Sell Your Products too

Furnace manufacturers know that using a good motor in their product pays off. From the design stage . . . through production . . . through fast selling, they know that the General Electric shaded pole motor is their best bet for a far better product.

Your product, too . . . whether you design and build furnaces, cooling fans, unit heaters, condensing coolers, exhaust fans, evaporative coolers, or others . . . can be made a better product by using this versatile G-E shaded-pole motor with unit bearing construction.

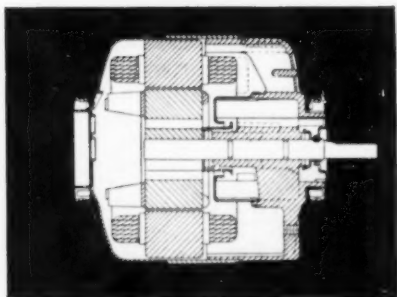
Look at the outstanding advantages of this motor . . . all-angle operation, lubrication for life, streamlined appearance, light weight and quiet operation, plus dependability. All the features you want in a motor. *Here* is a motor that will help you sell your product.

For complete information on ratings that are available contact your nearest General Electric Apparatus Sales Office today. General Electric Company, Schenectady 5, N. Y.

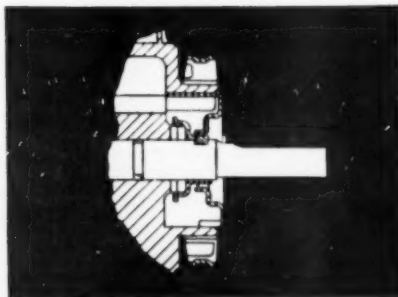
704-3

You can put your confidence in—
GENERAL  ELECTRIC

should use a G-E Shaded Pole Motor...



4 **QUIET OPERATION** is a feature everyone wants. This is gained by accurate alignment and positive lubrication.



5 **LUBRICATED FOR LIFE** avoids inconvenience of adding lubricant . . . reduces maintenance to a minimum for trouble-free operation.



6 **"EQUIPPED WITH G-E MOTOR"** helps sell your product by backing it up with G.E.'s reputation for quality motors.



4 Powerful Reasons Why CHEVROLET ADVANCE- DESIGN TRUCKS will save money on your job . . .

EXTRA THRIFTY POWER! The improved Loadmaster engine in heavy-duty models has new high-compression ratio (7.1 to 1) to squeeze more power . . . more work out of every drop of fuel. In light- and medium-duty models, Chevrolet's advanced Thriftmaster engine delivers top-notch operating economy. Both give you the extra-long life and day-in, day-out dependability for which Chevrolet valve-in-head truck engines are famous.

ENGINEERED FOR THE JOB! Whatever you haul . . . wherever you haul it, your Chevrolet truck will be factory-matched to fit your requirements. That means you get the *right* power and the *right* chassis units throughout—tires, axles, springs and clutch—to suit your roads and loads. It means a truck that will do your job more easily . . . more efficiently.

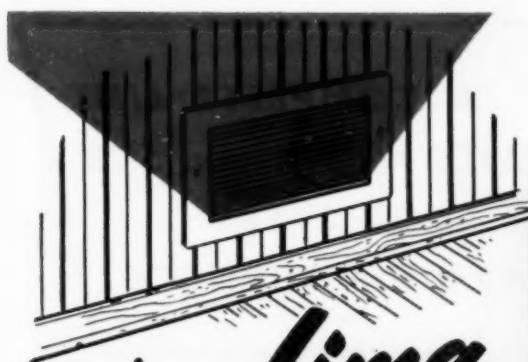
MORE RUGGEDLY BUILT! New Chevrolet trucks are stronger and sturdier than ever before. Frames, for example, are heavier and more rigid. This extra, built-in stamina means miles added to truck life and dollars *subtracted* from upkeep costs! Another important "plus" you get with Chevrolet trucks!

AND THEY LIST FOR LESS! No other truck offers all of Chevrolet's advance-design features . . . all of Chevrolet's money-saving advantages. Yet Chevrolet is the lowest priced truck line of all! See your Chevrolet Dealer. . . Chevrolet Division of General Motors, Detroit 2, Michigan.

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.





New Lima "45" wall diffuser

**for top efficiency in perimeter
heating with side wall or baseboard outlets**

Again Lima leads with the finest. The new Lima "45" Wall Diffuser offers all the advantages of perimeter heating from side wall or baseboard outlets.

Compare the diffusion pattern shown here with any wall diffuser on the market. See how much more effectively it provides correct air distribution . . . induces continuous recirculation of air without drafts . . . assures highest efficiency and complete customer satisfaction.

Exclusive Lima "Balancing Bell" eliminates quadrant dampers and simplifies balancing. Any housewife can make the adjustment at the diffuser.

Immediate delivery in 2 sizes, 10" x 6" and 12" x 6". Plan now to use the Lima "45" on your next perimeter heating installation where side wall or baseboard outlets are preferred. For complete literature see your local wholesaler or write direct.



Equally Efficient For Cooling

**For Simplified Out-Of-The-Wall
Installations In Old House or
Solid Wall Construction**

Install Lima WALL-O-WAY Stackhead And Frame
In Combination With The New Lima "45" Wall
Diffuser Or Lima Standard Wall Register

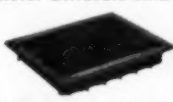
See how easily you can now make out-of-the-wall installations with the Lima Wall-O-Way. Prefabricated stackhead snaps into any standard $3\frac{1}{4}$ " stack or fitting—no cutting or folding back. Exclusive Lima double gasket seals against dirt streaks.

For warm air outlets, install stackhead and frame using the new Lima "45" Wall Diffuser or Lima standard Wall Register. **For cold air outlets**, install frame only, using Lima standard Flat Sidewall Grille.

The World's Finest Perimeter Diffusers And Complete Register Line



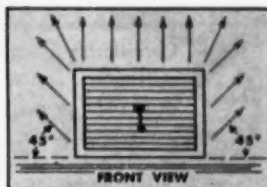
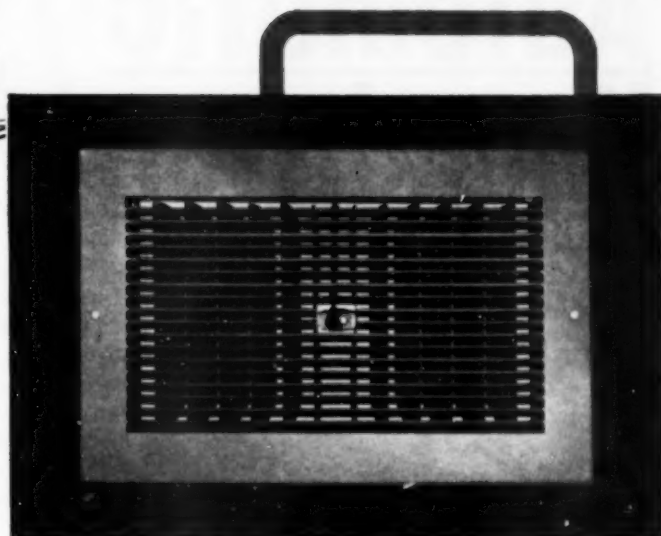
LIMA FLOOR DIFFUSER



LIMA FLOOR REGISTER



LIMA WALL REGISTER



Front view of Lima "45" Wall Diffuser air pattern. Note how warm air is sprayed upward and to all sides at reasonably high velocity, starting at 45° from floor and extending over a 90° spread.

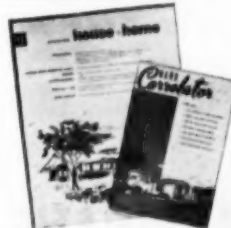


Side view Lima "45" Wall Diffuser air pattern showing 20-22 1/2° angle away from wall which eliminates streaking. Notice the correct 70° angle from floor for top efficiency.

sold exclusively through heating wholesalers and manufacturers

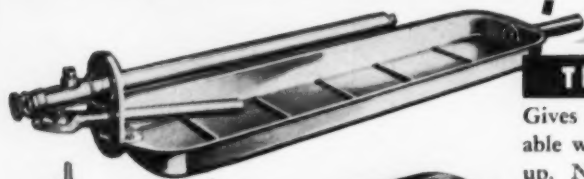
Lima Register Company
World's Finest Diffuser and Register Plant
LIMA, OHIO

Nationally
Advertised
To Builders
And Architects



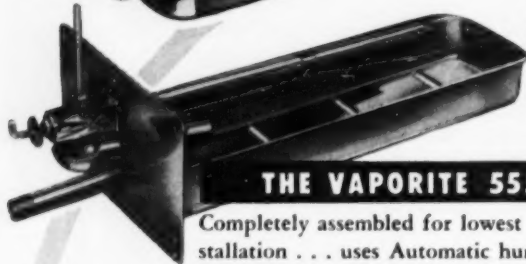
Automatic Humidifiers

**A COMPLETE LINE
WITH A TYPE and SIZE
FOR EVERY
WARM AIR FURNACE**



THERMO-DRIP

Gives furnace owners the most efficient, most dependable way to put moisture in the air. Valves don't lime up. No stagnant pool to reheat. Sensitive thermostat. Easily installed. Water drips into pan only after pan is sizzling hot. This puts the most moisture into the air stream when it is most needed.



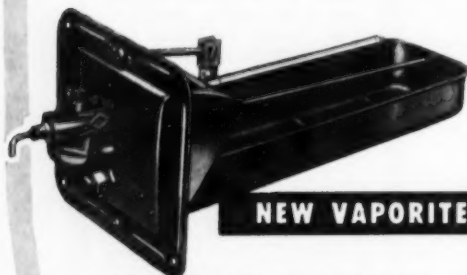
THE VAPORITE 555

Completely assembled for lowest cost installation . . . uses Automatic humidifier drip feed principle. Positive thermostat control feeds water to vapor pan according to heat. Pan is dry when furnace is cold. Stainless steel pan insures rapid heat transfer to water. One size, one kit slashes time and labor cost.



VAPORITE SERIES 500

Uses famous drip feed principle of putting moisture into the air . . . a measured amount at a time. Thermostat accelerates drip rate as furnace becomes hotter. Cuts down rate as furnace cools. This keeps air properly balanced with moisture at all times. Uses stainless steel pans.



NEW VAPORITE 577

Made especially for sloping bonnet furnaces, but adjustable so that it can be installed just as easily on straight bonnets. Preassembled for fastest installation. Can be adjusted to any angle of bonnet pitch with an ordinary screw driver. No hard-to-get-at nuts and bolts. No iron framework to level the vapor pan. Made of stainless steel. Weighs less than 4 pounds. Vapor pan is supported permanently and rigidly in level position. Cannot sag.



MODEL CF500

FOR COUNTER FLO FURNACES

Makes healthful humidified warm air available in homes with perimeter systems. Requires no pans to buy or install. Bottom of plenum chamber in concrete floor is evaporating surface. Drip feed automatically accelerates or shuts off as furnace temperature fluctuates. When furnace is not in use, plenum chamber is dry.

A-83

Write today for free literature on these most efficient, most dependable humidifiers.

AUTOMATIC HUMIDIFIER COMPANY • CEDAR FALLS, IOWA

DO YOU COME
FIRST
OR **LAST**
IN YOUR
HEATING
FRANCHISE ?

AJAX Furnaces ARE SWELL



AJAX
furnaces are
just dandy.

AJAX
furnaces are
really peachy.

AJAX
furnaces are
mighty fine.

AJAX furnaces can be
installed to burn
coal, wood, or garbage.

see your **AJAX** dealer
Jones Heating Co.

YOURS

for the asking



50
YEARS
of heating
experience

HENRY JONES

LET US HELP YOU

JONES
HEATING CO.

SPECIALISTS IN

HEIL
Automatic Heat

HEIL

Puts the dealer

FIRST

Almost any dealer in heating knows this simple fact: No matter what effort the factory makes, the dealer almost entirely controls what the customer buys. He can suggest brands, switch customer preference, or even stop a sale. It took HEIL to recognize this fact, and to do something about it, by putting you, the dealer FIRST, where you belong.

You can see the difference in HEIL newspaper mats. You come first, you get most of the space. You can see it in HEIL dealer sales aids—you get the most complete package ever offered to help *you* do the kind of selling *you* know how to do. No question about it, it's *your* merchandising program, and probably nobody else in the heating field is as merchandising-minded as HEIL.

More than that, every last piece of HEIL heating equipment is designed for you. Before a single model was built, thousands of dealers were asked what they wanted in heating—then HEIL gave it to them. As an example, you dealers recently told us *yourselves* that you can save an average of \$47.85 on each installation of a packaged HEIL unit.

The HEIL franchise, too, puts *you* first. You have more than a scrap of paper... you have a friendly relationship that takes the headaches out of doing business. When you sell HEIL you make more money, more easily, because you get help where you need it most—on your own doorstep. Write today for facts on the HEIL franchise. You'll be glad you did.

THE HEIL CO.

HEIL Automatic Heat is sold
through wholesale distribu-
tors. A few good territories
are available.

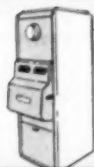
MILWAUKEE 1, WISCONSIN

HILLSIDE, NEW JERSEY

SALES OFFICES: Hillside, N. J.; Atlanta, Ga.; Washington, D. C.; Cleveland, Ohio; Chicago, Ill.; Detroit, Mich.; Milwaukee, Wis.; Kansas City, Mo.; Denver, Colo.; Dallas, Tex.; Los Angeles, Calif.; Seattle, Wash.



Oil-Fired and
Gas-Fired Winter
Air Conditioners



Oil-Fired and
Gas-Fired
Highboys



Oil and Gas
Conversion
Burners



Oil-Fired and
Gas-Fired
Boilers

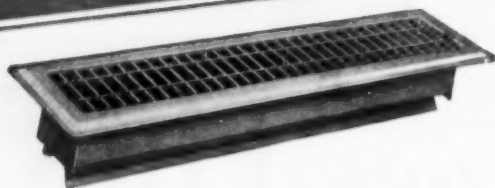
Directed Air Flow

for
Modern Perimeter Heating
with

INDEPENDENT

"Fabrikated"
REG. U. S. PAT. OFFICE

FLOOR REGISTERS



No. 60A—Bars may be set to direct air flow up or to both sides.

● Register faces of the famous "Fabrikated" construction excel in rigidity, open area and attractive appearance. When valves are set in correct position, an adjusting screw permits directing the air flow to the outside wall.



These floor registers are made in seven standard sizes to fit openings $2\frac{1}{4} \times 14$; also from 4×10 to 6×14 with free air areas of 29 to 62 square inches. All sizes fully comply with code requirements of N.W.A.H. and A.C.A.

Write for complete catalog

Always Leading — Always Progressing

**THE INDEPENDENT
REGISTER CO.**

3747 E. 93rd STREET • CLEVELAND, OHIO

EQUIPMENT DEVELOPMENTS —

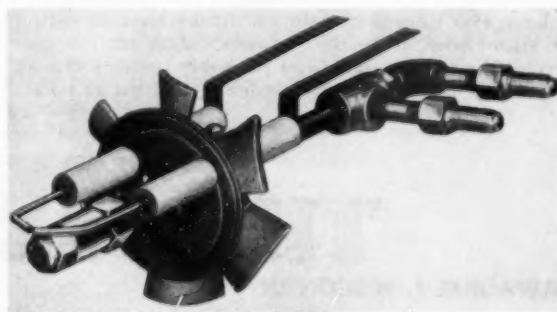
(Continued from page 117)

is designed for many automatic and semi-automatic welding processes. For applications where power demands are in higher ratings, any number of the units can be paralleled. Overall dimensions are 27 x 32 x 50 in. Electrical remote control allows the welder to be located at some distance from the work. Rated output is 600 amp at 40 volts, 60 per cent duty cycle. Primary volts are 230 or 460; primary amp, 108 or 54; Kw, 34.5; and open circuit voltage, 70.



Aluminum Coated Joist Lining

IMPROVED JOIST LINING, with sheets aluminum coated on both sides for smooth finish and moisture resistance — Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago 6. The lining is available in $16\frac{1}{2}$ and 33 in. widths to enclose either one or two joist spaces into cold-air return ducts in warm air heating systems. It is either nailed or stapled to the underside of the joists. The application can be conveniently handled by one man. A Pittsburgh lock at one end makes a finished joint between the sheets and facilitates their application. Each width is supplied in random lengths of 26 to 30 in.



Low Pressure Oil Burner

MODEL EL low pressure oil burner for use with upflow and downflow oil fired air conditioning units for small homes, where a low Btu capacity is required — The Majestic Co., Inc., 733 Erie St., Huntington, Ind. The

If you've ever yanked up a built-in cap flashing to get at the base flashing...

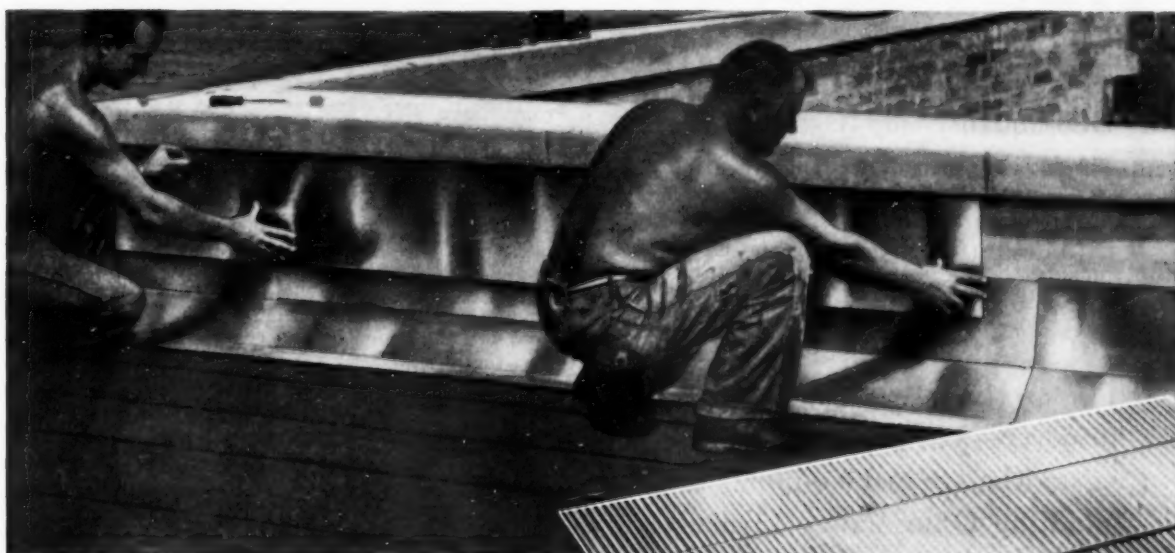


And then tried to make it lie flat without cracking at the bend..



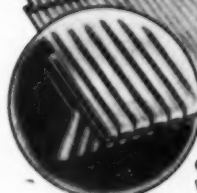
Then you know why it's better to use the new

CHASE® one-piece thru-wall FLASHING and CAP FLASHING RECEIVER!



Because you can use cold rolled copper for cap flashing. You can insert it easily *after* the base flashing is in...without the use of plugs, fillers, or wedges! The receiver stays open, even under the weight of the finished wall.

Send today for specifications and details.



Chase



BRASS & COPPER

WATERBURY 20, CONNECTICUT • SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass & Copper

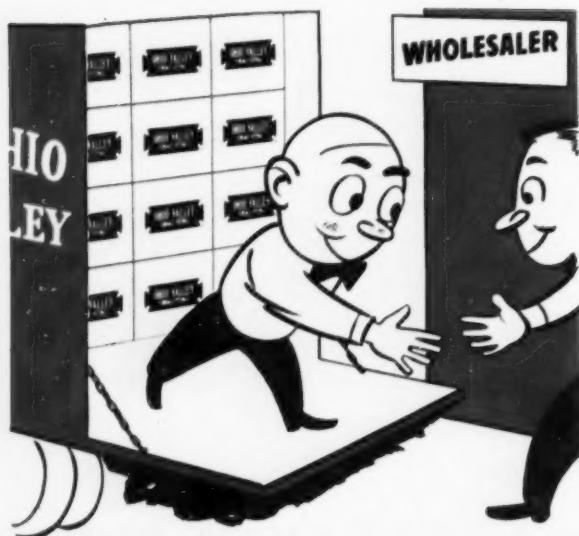
Albany†	Boston	Cleveland	Detroit	Kansas City, Mo.	Minneapolis	New York	Providence	San Francisco
Atlanta	Chicago	Dallas	Houston	Los Angeles	Newark	Philadelphia	Rochester†	Seattle
Baltimore	Cincinnati	Denver†	Indianapolis	Milwaukee	New Orleans	Pittsburgh	St. Louis	Waterbury

(†sales office only)

**Chase Brass & Copper Co., Dept. AA-853
Waterbury 20, Conn.**

Please send me your free folder on the new Chase One-Piece Thru-Wall Copper Flashing and Cap Flashing Receiver.

Name _____
Position _____
Firm _____
Street _____
City _____ State _____



OHIO VALLEY GIVES REAL SERVICE

High quality and fast, efficient service are gaining more and more new wholesalers for Ohio Valley furnace fittings. Quick delivery and highest quality mean money to you.

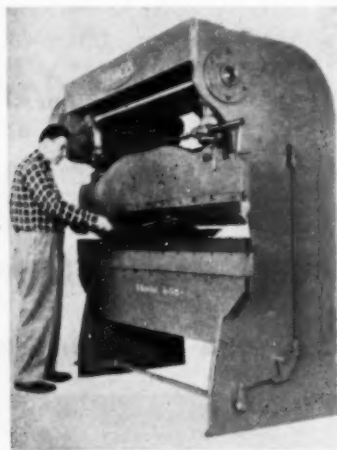
For quality, service, and fast turnover—join the list of wholesalers who are making profits by handling Ohio Valley furnace fittings.

Write for our Catalog



Ohio Valley Hardware & Roofing Company
METAL MANUFACTURING DIVISION, EVANSVILLE, IND.

unit has a range of 0.4 to 1.50 gph. Screwdriver adjustments in this range may be made on the job. Features include a cast aluminum fan housing with built-in junction box; four-in-one multiple breakaway baffle plates; multiple air adjusting bands; and standard serviceable parts.



Press Brake

NEW 6 AND 8 FT "Semco" sheet metal forming power press brake — Service Machine Co., Inc., 466 Miller St., Elizabeth 4, N.J. The friction factor of operation has been kept to a minimum, the company states. Features include a normalized ram and welded steel frame; precision adjustment of the ram (one complete revolution of the operator handle adjusts 0.008 ft); a cast steel flywheel running on ball bearings; adjustable variable speed drive; and a 1½ hp motor. It stands 79 in. high, 44 in. deep, and 66 in. wide. Ram and bed plates are 72 and 96 in., respectively, for the two models. A variable range of 16 to 40 strokes per minute is obtained by handwheel adjustment.

Control for Dehumidifiers

PLUG-IN type humidity control for automatically regulating the operation of portable home dehumidifiers — Minneapolis-Honeywell Regulator Co., 2726 4th Ave. S., Minneapolis. It utilizes a human hair as the sensing element. For installation, the instrument is hung on a wall, and the cord is plugged into the wall, an electrical cord from the dehumidifier being plugged into the female outlet. If the per cent of humidity in the house becomes greater than that for which the control is set, the dehumidifier will be turned on automatically, and then turned off when humidity level is correct.

Electrode Holder

ELECTRODE HOLDER for arc welding — Welding Products Div., A. O. Smith Corp., Box 584, Milwaukee 1. The jaw lever is placed close to the handle to minimize the tendency of the holder to roll in the operator's hand. A squeeze of the hand releases the electrode stud. The

CURVED BAFFLES

Reg. U. S. Pat. Off.



PUT AIR WHERE IT
IS MOST NEEDED

TITUS

PERIMETER

Diffusers

NEW STANDARD OF PERFORMANCE THAT TAKES AIR DISTRIBUTION OUT OF THE PAST

Make no mistake about it... *the special patented baffles*... make all the difference in the world in the air distribution performance of *TITUS DIFFUSERS*. These baffles direct the air stream over the entire wall from floor to ceiling. Give 180° diffusion. This near perfect performance eliminates drafts. Makes house warmer because outside walls are warmer.

OLD-FASHIONED-TYPE REGISTERS SIMPLY CAN'T COMPARE

They do not have the adequate control surfaces — properly placed — to correctly distribute cooled or heated air.

COMPLETELY NEW BEAUTY

No longer is it necessary to disfigure lovely walls with old-style registers. Titus diffusers install in the baseboard and recess to be unobtrusive. Streamlined appearance blends with room. Smooth contours permit drapes to slide easily past diffuser without catching or snagging.

REQUIRES ONE-HALF THE LABOR, ONE-HALF THE DUCT WORK OF ORDINARY INSTALLATIONS. No roughing-in necessary. Makes amazing savings on every job.

ORDER A SAMPLE TITUS GRILLE TODAY DIRECT OR FROM YOUR JOBBER.

GIVE YOURSELF A SHOWDOWN DEMONSTRATION... PROVE ONCE AND FOR ALL ITS *OUTSTANDING BEAUTY*... *STRONGER CONSTRUCTION*... *GREATER DIFFUSION EFFICIENCY*... ABSOLUTELY HAVE NO EQUAL.

FREE NEW 1953 CATALOG



TITUS, INC., WATERLOO, IOWA

Please rush me the following:

- ☐ Booklet of Trends in Warm Air Heating
- ☐ Complete New 1953 Catalog, including Engineering Data
- ☐ Information on New Quick Sales Display Promotion Kit
- ☐ New Consumer Circular

NAME _____

ADDRESS _____

CITY _____ STATE _____



reversible jaw insulators can be reconditioned on the line. The holder is available in 200, 300 and 500 amp sizes.



Vent Cap



Filter

Tank Vent Cap

"2 IN 1" TWO-WAY tank vent cap for venting fuel oil tanks — Sicard & Paul, 2921 Stevens Ave., Minneapolis 8. It fits two different pipe sizes. Only three models are needed to fit any pipe used in storage tank installations, the company states. There is no need for pipe threading. The cap is set on the pipe and tightened with a single set screw. An Allen wrench is the only tool required. Filter screens are optional.

Fuel Oil Filter

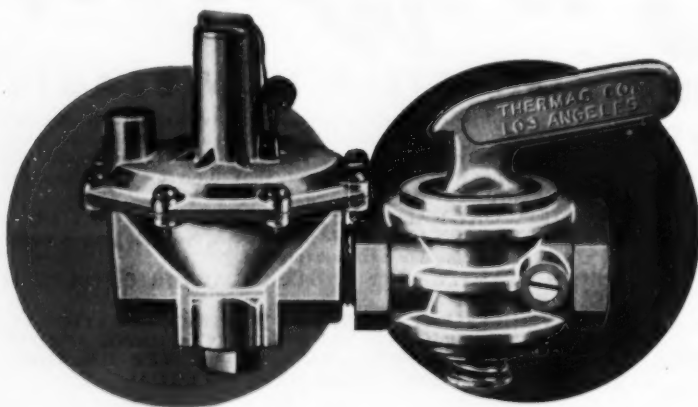
MODEL 243-SY "Trap-It" fuel oil filter for all types of oil heating applications — A-P Controls Corp., 2450 N. 32nd St., Milwaukee 45. The unit has a fine-mesh monel metal screen with a large strainer surface. The monel is highly resistant to corrosive acids, is quickly removable for cleaning, and never requires replacement, the manufacturer states. It is rated at $2\frac{3}{4}$ gph on No. 3 fuel oil, and up to $5\frac{1}{2}$ gph on No. 1 or No. 2 oil. It is made in two connection sizes, $\frac{1}{4}$ or $\frac{3}{8}$ in. IPT.

Fasteners for Conductor Pipe

CONDUCTOR pipe fasteners with shanks of high carbon galvanized steel — Klauer Mfg. Co., 9th and Washington St., Dubuque. Available in two types — for wood or brick walls — they have an encircling design with a $\frac{1}{10}$ in. offset shoulder intended to simplify line-up of the pipe.

Structural Steel Framing Members

"VERSABAR" STRUCTURAL STEEL framing members — M-H Standard Co., 515 Communipaw Ave., Jersey City 4. The channel is made of cold rolled carbon steel in four basic sizes, and can be provided in different combinations to suit specific requirements. A variety of standard and special fittings, brackets and nuts are available, the serrated nuts being specially designed for use with the channels and furnished with or without



APPLIANCE REGULATOR

Here's the famous Thermac "T" Series Regulator used on millions of gas appliances. Use it now in conjunction with the THERMAC Main Gas Shut-Off Valve.

- ① Lower cost per BTU capacity
- ② Greater BTU capacity per size
- ③ Small octangle body easy to install
- ④ Greater diaphragm sealing area prevents leaks

GAS SHUT-OFF VALVE

Costs considerably less yet it is 2 to 3 times stronger and greater in capacity than ordinary gas control valves. This new Thermac valve, made of special high tensile aluminum alloy long proved in aircraft practice won't gall or stick. Valve rotor is treated with a hard facing and special long life lubricant. Pilot gas take-off may be provided on either side. Appliance manufacturers are invited to request samples and quantity prices.

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Use Thermac Regulators and Shut-Off Valves together for greater economy.

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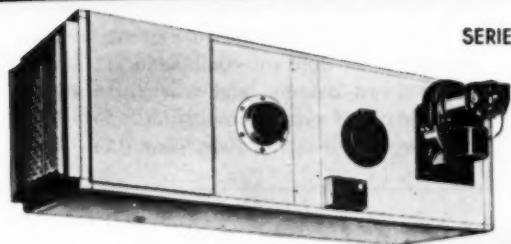
LOS ANGELES 59, CALIF.

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MONCRIEF'S HORIZONTAL FURNACES

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4 MODELS!



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2 MODELS OIL-FIRED

with

84,000 B.T.U. Output

123,000 B.T.U. Output

A Capacity for Practically

ANY SIZE of Gas or Oil

Horizontal Installation!

Compact in Construction!

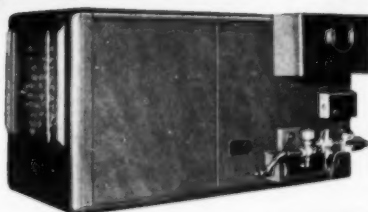
High in Quality—Low in Cost!

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85,000 B.T.U. Input



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Approved for
Natural,
Manufactured,
Mixed and
Liquefied
Petroleum
gas.



See your Moncrief jobber today! Get the complete story... the low attractive prices on Moncrief Gas and Oil fired Horizontal Furnaces for residential and commercial installation.

THE HENRY FURNACE COMPANY

• Medina, Ohio

HEATING AND AIR CONDITIONING UNITS

MONCRIEF

FURNACE PIPE AND FITTINGS

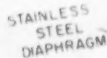
MODEL EL low pressure oil burner with a range of 0.4 to 1.50 gph — Wayne Home Equipment Co., Inc., 301 Glasgow Ave., Fort Wayne. Screwdriver adjustments in this range may be made on the job by a change of the

Flashing Cement Compound

Сапору

Propeller Fans

VENTURI TYPE steel inlet orifice propeller fans — The Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., N.E., Cleveland 14. Direct drive propeller fans are offered in six sizes, from 12 to 30 in. in wheel diameter. Motors are specified in all standard currents and voltages, resulting in 13 different combinations. Motors have internal thrust bearing, and fans are available for both horizontal and vertical installation. Belt drive propeller fans are offered in five sizes, from 24 to 48 in. in wheel

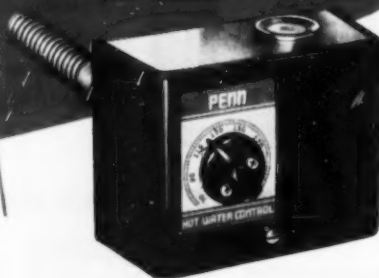


HOW IT WORKS



The PENN patented, self-compensated diaphragm structure consists of a single diaphragm of low expansion stainless steel backed by a brass retaining cup. The difference in expansion between these two metals creates just enough additional space between them on a change in ambient temperature to accommodate the liquid expansion. Thus, this expansion (due to ambient temperature change) does not deflect the diaphragm to cause switch operation. *Only* liquid expansion (or contraction) due to temperature changes *at the bulb* can affect diaphragm to create switch operation.

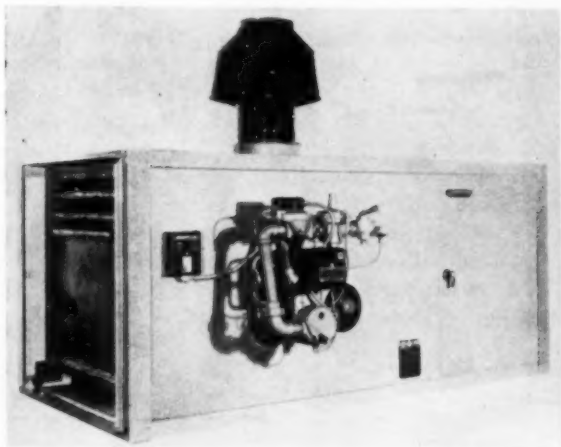
Type 518 Safety Limit Control for warm air . . . also available in Type 519 Fan Control. It can be mounted in close quarters in any position or at any angle.



Interior of Type 520 Combination Fan and Limit Control. Note enclosed contact mechanism, accessibility of terminals for easy wiring, and the "sight-set" calibrated dials.

AMERICAN ARTISAN, AUGUST 1953

diameter. Fan wheels are deep pitch, quiet operating pressure type, and fan panels are of heavy gage sheet steel.



Warm Air Suspension Furnace

GAS-FIRED, 450,000 Btu input warm air suspension furnace featuring an electronically controlled power burner and a specially designed combustion chamber — Jackson & Church Co., 321 N. Hamilton St., Saginaw 65, Mich. The new horizontal stainless steel combustion chamber is designed to efficiently distribute the flames throughout the heater body for maximum heat transfer. The elec-

tronically controlled power burner provides more positive air mixture and better operating efficiency, and electric eye protection shuts off the burner if the fuel is curtailed, the company states. Units measure 80 in. long, almost 36 in. high, and 38 in. wide. They are designed for 4600 cfm of air replacement at bonnet. A 15 in. blower and a 1 hp, 1750 rpm motor are used.



Chimney Housing

ABOVE-THE-ROOF chimney housing composed of 3/16 in. cement asbestos panels — The Van-Packer Corp., 209 S. LaSalle St., Chicago 4. The shape is rectangular, 24 x 16½ in. The housing, pre-painted in a brick design, is shipped in knocked-down panels with angle iron supports. The panels are cut to suit the roof pitch, can be

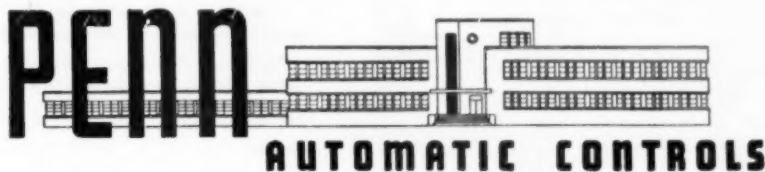
FOR TODAY'S MODERN HEATING SYSTEMS **CONTROLS with FAST RESPONSE**

In thousands of installations . . . both warm air and hot water . . . heating men report that PENN Controls give *faster response, greater accuracy, more dependability* and are *easier to install*.

One of the reasons for this superiority on the job is PENN's patented, self-compensated diaphragm structure which eliminates the effect of ambient temperatures. Another reason is the liquid-filled power element which has greater sensitivity combined with dependable performance year after year. Then there is the compact,

snap-acting contact structure totally enclosed to assure a dust-proof, tamper-proof, dependable switching mechanism.

And there are many other reasons which make PENN heating controls "tops" for any system with every kind of fuel. Try 'em on your next heating job . . . and you'll agree! Ask your burner manufacturer, wholesaler or write **Penn Controls, Inc., Goshen, Indiana**. Export Division: 13 E. 40th Street, New York 16, N. Y., U.S.A. In Canada: Penn Controls Limited, Toronto 13, Ontario.

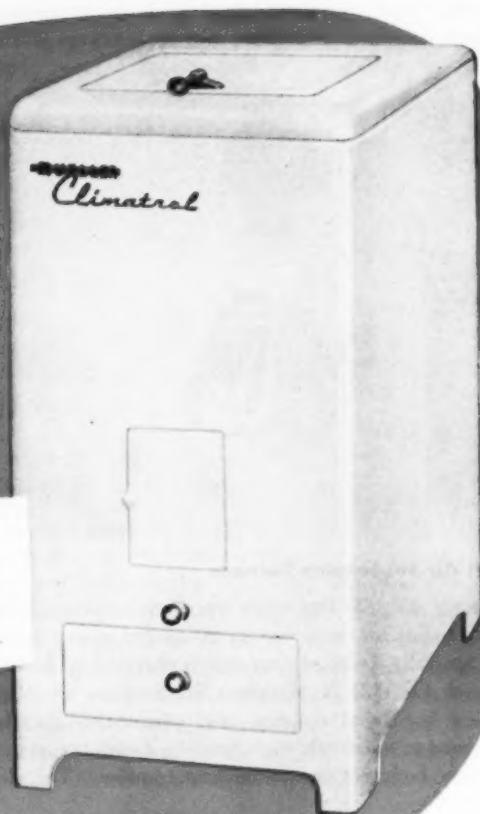


FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES



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Climatrol
Gas-Fired
Incinerator

...for new profits
the year around



You sell a famous, nationally-advertised brand name!

You offer the plus value of Mueller Climatrol design advantages!

Sized right—has 1.6 bushel capacity to handle big family garbage and trash. **A.G.A. approved** — for continuous operation.

Handsomely designed—available in standard grey or deluxe white models.

Easy to install—shipped assembled. Simply install flue and run gas line to unit.

Trouble-free — once installed, unit requires no servicing. Light and forget — no moving parts.

Burns anything — except metal or glass — including rinds, peach pits, old shoes, paper, vacuum-cleaner dirt, corn cobs and magazines.

For money-making details,

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MORE profits from Mueller Climatrol are coming your way — all year 'round. For now Mueller gives you something new to sell — the Mueller Climatrol Incinerator. It's handsomely styled and attractively priced, to give you the jump on competition in the big, year around home-incinerator market. And it sells in the months when your regular heating business is apt to be slow.

But that's not all — you profit another way, also: Every sale of a Mueller Climatrol Incinerator is a "door-opener" that helps you uncover new prospects for Mueller Climatrol heating and air-conditioning equipment.

Yes, sir, the Mueller Climatrol Incinerator offers a double-barreled, volume-building opportunity you can't afford to pass up. Get the whole story now, by mailing the coupon below.

D-134-B



Mueller Climatrol

L. J. MUELLER FURNACE COMPANY
 2030 O. Oklahoma Ave., Milwaukee 15, Wisconsin

The Mueller Climatrol Incinerator sounds like more money in the bank for me. Send more information.

Name.....

Company.....

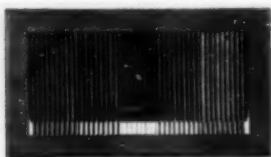
Company Address.....

City..... State.....

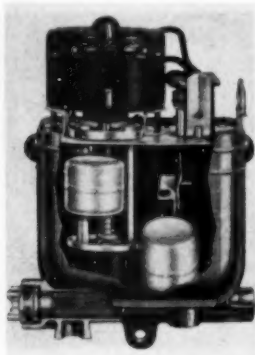
used on any pitch or ridge, and are easily assembled and nailed to the roof, the manufacturer states.

Diffuser Sidewall Register

No. 1356 DIFFUSER SIDEWALL register for small round duct, perimeter, perimeter loop, radial, and radial loop installations — U.S. Register Co., 324 E. Burnham St., Battle Creek, Mich. For 4, 4½, and 5 in. small round duct use, 10 x 5, 12 x 5, and 14 x 5 sizes are offered. For 6, 7 and 8 in. sizes in the other systems, 10 x 6, 12 x 6, and 14 x 6 sizes are offered. The diffuser directs the air stream sufficiently away from the walls to avoid discoloration of curtains and walls, the manufacturer states. It is designed to diffuse the air in a widespread range that blankets the windows and the outside walls.



Above: Register



Right: Oil Lifter

Automatic Oil Lifter

REDESIGNED MODEL 346 automatic "Oilifter" designed to convert oil-burning equipment using vaporizing burners to completely automatic operation — A-P Controls Corp., 2450 N. 32nd St., Milwaukee 45. On furnaces, space heaters, and other equipment it eliminates the need for filling the appliance tank manually, since it lifts oil from an outside or basement tank. Featured are an extra safety float and an automatic safety switch. No overflow pipe is necessary. A 100-mesh monel screen is built into the unit to prevent entrance of dirt and other foreign matter. It may be used for vaporizing, rotary gun-type or conversion oil burners, space heaters, or any system requiring oil-lifting capacity up to 4 gph at 15 ft lift, or 3 gph at 25 ft lift.

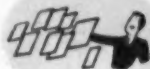
Automatic Gas Fired Incinerator

"CONSUM-ALL" automatic gas fired home incinerator — Cribben and Sexton Co., 700 N. Sacramento, Chicago. Three models are offered (for bottled as well as city gas): fully automatic, in 1½ and 2½ bushel capacities, and a 1½ bushel size for manual operation. The design is cylindrical to eliminate clogging as a result of burning operations. All models are 37½ in. high. All dry material is burned (in an average of 20 minutes), resulting in a heating of the firebrick lining which, without further fuel, dehydrates wet garbage, completing the process. The hydraulic firebrick lining, subjected to over 2000 F

Mueller Climatrol

Backs Its Customers

*throughout
the year with*



... selling programs!

Not just "run of the mill" factory suggestions, but down-to-earth, complete selling programs that dealers can use effectively to increase their sales and profits.



... sales training!

Our sales representatives are continually staging sales-training meetings for Mueller Climatrol customers — both to show them what is new with Mueller Climatrol and to bring them up to date on Mueller Climatrol products.



... sound sales counsel!

Each product division in the complete Mueller Climatrol product line is backed up by a sales engineering department. They translate the product to you, in terms of its manufacture and of its featured sales points. Our men are experts in their field, giving you sound sales counsel to help increase your earnings.



... guidance!

Every year, hundreds of heating dealers attend Mueller Climatrol schools in Milwaukee and throughout the country. At these schools, the Mueller dealer gets up-to-the-minute information and guidance on Mueller products and sales policies.



... factory follow-thru!

We back our customers with one of the strongest advertising and sales promotional programs of any manufacturer in the industry, and through our nearly 100 years of operation, have established the name of Mueller so it's known and accepted throughout the world. Mueller Climatrol follows through on its program — we give our customers action! Write us for the plan you want — now!

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EASIER to INSTALL

Auto flo "100"

**AUTOMATIC
HUMIDIFIER**



**NO
FLOAT**

**NO
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Eliminate Humidifier Service Calls

The revolutionary new Auto-Flo "100" Humidifier requires no servicing other than an occasional cleaning of the pan and the yearly replacement of the plates. A large steel drain clip replaces the float valve and there are no parts to stick, wear or clog up. Evaporator plates are equipped with drain clips to eliminate any possibility of damage.

**ONE YEAR FACTORY
GUARANTEE ON
ALL
PARTS**

THIS IS
Auto flo's
**Stainless Steel
"DRAIN CLIP"**
that Prevents
WATER DRIP

*Water drains
into pan
below*

AUTO-FLO CORP.

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Auto-Flo Corp.
13526 Fenkell, Detroit 27, Mich.

Please send me full information on Auto-Flo "100" Automatic Humidifier.

Name _____

Address _____

City _____

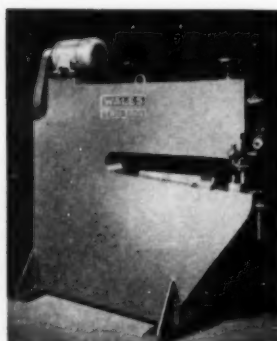
State _____

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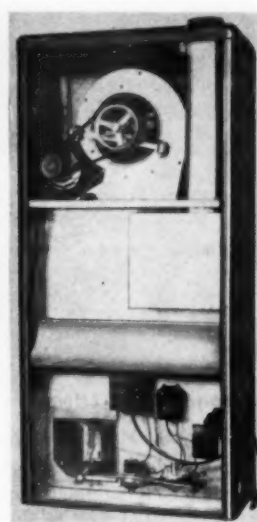
in its manufacture, will not rust out, burn out, or warp, according to the manufacturer.

Large Shear

GIANT MODEL "Tru-Edge" shear designed for contour and straight inside and outside shearing, beading, louvering, and joggling — Wales Strippit Corp., 345 Payne Ave., North Tonawanda, N.Y. It has a capacity of up to 9/32 in. thick mild steel. A new shearing principle eliminates resistance to feeding and turning of the work, the company states. Feeding of material may be started while the ram is operating. Inside cutting requires no starting holes. The cam design provides vibrationless operation. The shear cuts from 10 to 36 ft per minute, depending on gage and material. Throat depth is 36 1/2 in.



Above: Shear



Right: Furnace

Gas-Fired Furnaces

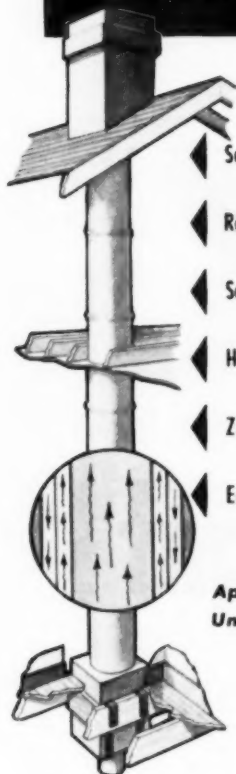
"REV-FLO" counterflow gas-fired furnaces for residential perimeter heating installations — Sequoia Mfg. Co., 1002 Brittan Ave., San Carlos, Calif. Sizes now in production are 80,000, 100,000, and 120,000 Btu. Units are designed for an especially shallow depth (16 to 24 in.), a 28 1/2 in. width, and standard height. All connection points position on the face of the unit for rapid installation. The furnace can be installed in normal size linen closets or wall alcove openings. In regular closets, with the shallow depth and minimum AGA-approved clearances, general storage space is left when units are installed.

EQUIPMENT BRIEFS

MODEL 14-AU 1/4 in. full ball-bearing drill with aluminum alloy frame, heat treated alloy steel gear, Jacobs 3-jaw geared chuck, and a motor with a no-load speed of 2500 rpm — U.S. Electrical Tool Div., The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21.

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for EXTRA PROFITS!

THULMAN CHIMNEY



- ◀ Saves 1/4 to 1/2 on chimney costs
- ◀ Ready-made in lightweight sections
- ◀ Self-cooling, non-condensing
- ◀ Hangs on joists; needs no footing
- ◀ Zero clearance to combustibles
- ◀ Easy to install

Approved for all fuels by
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**HIGH EFFICIENCY
LOW COST**

A lightweight, aluminum, easily-installed chimney you can profitably sell in a "package" for one or two story homes. *The fastest selling chimney idea on today's market!* Inner flue is 20-gauge steel heavily coated with vitreous enamel. When hot flue gas enters the chimney, patented action causes cold air to circulate down inside the outer casing and up between inner casing and central flue. Outer casing stays at safe temperature even when flue gas reaches 1700° (UL Test).

Ideal for modern incinerator installation.

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NEW BRIDGE, CONNECTICUT

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AEROFUSE DIFFUSERS...
Alnor **VELOMETER"**



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The Velometer is the *only* instantaneous, direct-reading air velocity meter—accurate in all ranges, from high to low—compact, portable, easy to understand and use. Wide assortment of jets and fittings makes this precision instrument ideally suited for all air velocity measurement.

Get an Alnor Velometer for your air measurement needs. You'll save time and money wasted in balancing air distribution on your *next* job. If you'd like a copy of Tuttle & Bailey instructions on balancing Aerofuse Diffusers with the Velometer, just send the coupon below.

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There are **3** ways
you can profit more with **bryant**

1. You can profit more on the initial sale! All Bryant Forced Air Units are available to you at attractively low, margin-boosting prices.

2. You can make an extra profit! Today, many furnace sales present an opportunity to sell air conditioning as well. There are two Bryant lines of central cooling units—vertical and horizontal—to satisfy your need for a broad range of products that meet all requirements of cooling, space and price. It's a single source of supply for the complete job. And you can sell this broad line for installation with all Bryant Forced Air Furnaces—a most practical and positive profit opportunity for you.

3. You can maintain your profit! Bryant is famous for quality—and good quality means decidedly fewer, profit-shrinking “call-backs”.

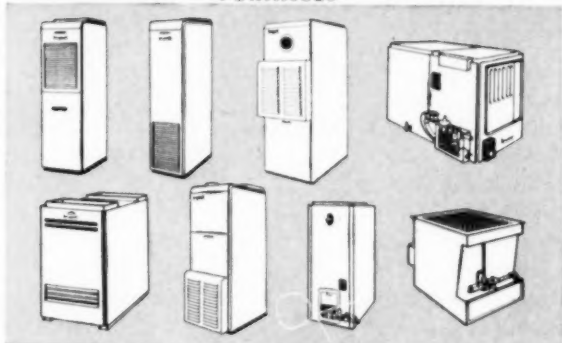
And Bryant helps you sell! To strongly supplement Bryant's extensive national advertising program, Bryant heating and air conditioning literature will be sent to over 80,000 families definitely known to be building new homes within the next 12 months. Names of these families in your area will be supplied to you—another reason to investigate this handsome, 3-way profit opportunity today.

Contact your Bryant distributor for complete information or write: Bryant Heater Division, Affiliated Gas Equipment, Inc., 17825 St. Clair Avenue, Cleveland 10, Ohio.

Profit with the name that everybody knows...

THE MOST COMPLETE LINE OF HOME CONDITIONING EQUIPMENT IN THE INDUSTRY

FURNACES



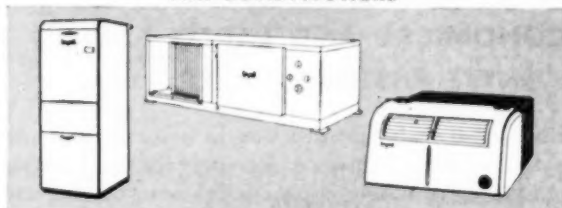
BOILERS



WATER HEATERS



AIR CONDITIONERS



SPACE HEATERS



bryant®

"BURDCO" REVERSIBLE, interchangeable fan blade hub — Alan E. Burden Co., Inc., 3352 Motor Ave., Los Angeles 34. It consists of two parts, the first being wedged into the fan spider, as a standard hub, the second fitting into the first. The second part is removable, and can be installed from either side to make a front or back assembly.

"STAINLESS STEEL 43" SOLDERING FLUX for use on stainless steel, monel, inconel, nichrome, and other metals — Remont Mfg. Co., 1310 Meyers Rd., Lombard, Ill. It removes oxides without affecting corrosion resistant properties and assists solder to flow at the lowest possible temperatures, the manufacturer states. It is suited to solder-iron, flame or dip soldering.

TYPE CIF FLEXIBLE COUPLINGS designed to "crawl into the flywheel" — Lovejoy Flexible Coupling Co., 5041 W. Lake St., Chicago 44. It is a standard coupling with one hub cut off. Three or more holes are tapped in the remaining flange by which the coupling is fastened to the center of the flywheel.

SILICONE WELD-BACKING COMPOUND — General Electric Co., 1 River Rd., Schenectady 5. It is designed to permit greater welding flexibility by promoting uniform penetration and eliminating the harmful effects of air on the underside of welds. Made from "bouncing putty," the compound is similar in appearance to paint.

WIDER CORRUGATED ALUMINUM sheets for roofing and siding, and wider industrial corrugated sheets — Reynolds Metals Co., 2500 S. 3rd St., Louisville. The new sheets are 48 in. wide, requiring fewer side laps, and making possible a saving in metal area ordinarily used in these laps, the company states.

MODEL V-103 BLADE (one third longer than the former one) for the "Modern" utility knife — David Levow, 308 W. 20th St., New York 11.

"FLAME-SPRAY" HAND GUN which shoots porcelain material through an acetylene torch and fuses it to steel in order to prevent corrosion — Seaporcel Metals, Inc., 23-20 Borden Ave., Long Island City 1, N.Y. The gun is still under development. It provides protection against sea water, the elements, smoke, and chemicals. Applications include buildings and other steel structures too large for factory treatment.

"TINS-TYTER" CONCENTRATED soldering flux for use on iron, steel, copper, bronze, brass, zinc, terneplate, and various alloys — Remont Mfg. Co., 1310 Meyers Rd., Lombard, Ill. Diluted with up to four parts water, it is used for easy-to-solder metals; concentrated, it penetrates into joints and seams of heavily oxidized metals or alloys difficult to solder, the manufacturer states. It is suitable for solder-iron, flame or dip soldering.

FOUR SYSTEMS —

(Continued from page 65)

consumption (items h and j), most of the listed items were essentially the same in magnitude. Since fairly wide differences existed in the fuel consumption, a more detailed discussion of these two items will be of interest.

The fuel consumption for the high wall system was practically the same as that for the perimeter system. Apparently, the additional ground heat loss with the perimeter system was offset by the larger heat loss in the upper part of the rooms with the high wall system.

The fuel consumption for the low wall system was about 16 per cent less than that for the perimeter system. The difference in fuel consumption of 95 cu ft of gas per day was attributed entirely to the additional heat loss through the floor slab with the use of the heated perimeter duct.

In the case of the floor slab for the low wall forced air heating system, the presence of the inactive perimeter duct tended to provide an additional insulating effect at the edge of the slab. Consequently, the 16 per cent reduction in fuel con-

sumption can be considered as the maximum that might be obtained.

The fuel consumption for the gravity system was about 14 per cent greater than that for the perimeter system. The difference has been attributed to the increased heat loss through the upper part of the room, as well as the higher flue losses (item g) resulting from the reduced air flow rate and high bonnet air temperature (item d) accompanying gravity operation.

Summary and Conclusions

The items mentioned are not all the factors of importance in evaluating the performance of heating plants, but they are the most important ones as far as comfort performance and fuel costs are concerned. The easiest way to show the comparative performances would be to give relative standings for each of the items mentioned, without attempting to decide which item is more important than another. This has been done in Table 5.

When all of the factors listed are taken into consideration, the two loop

perimeter system is shown to possess distinct advantages. In spite of the favorable performance of the two loop perimeter system, a critical analysis of its deficiencies indicated that further improvement was possible. Briefly stated, the following items were considered subject to improvement:

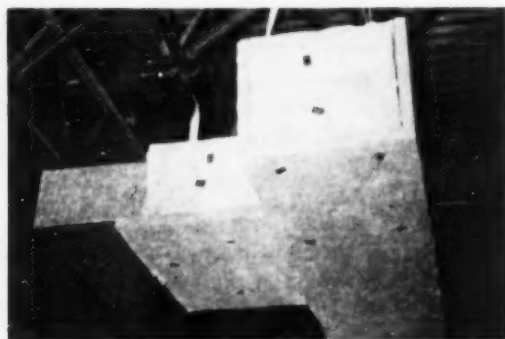
The fuel consumption could be reduced. The importance of adequate edge insulation is apparent.

A concentrated source of panel heating effect existed in that portion of the living room floor above the parallel feeder ducts, contributing to an unbalance of the system. The conclusion was reached that the feeder ducts should be spaced further apart and under separate rooms if possible.

The evidence also indicated that a more favorable design would consist of a continuous perimeter duct with relatively short distances between feeder ducts and the registers, feeder ducts arranged so that all sections of the perimeter ducts would serve as effective air passages, and relatively high velocities maintained in all sections of the perimeter duct.

The next article will cover studies involving some of these items.

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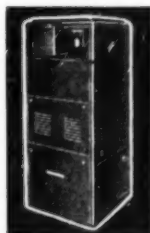
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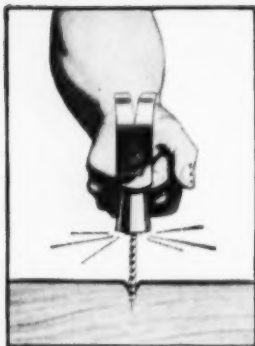
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*TRADE MARKS REG. U.S. PAT. OFF.



A BUILDERS EYE VIEW —

(Continued from page 100)

According to figures compiled by his company heat pump installations would not be economically feasible in any but residences costing over \$20,000, even in areas of low power cost. It was found, also, that homes in the central or northern part of the country had such an unfavorable ratio of cooling capacity to heating capacity requirements that too much heating had to be made up from resistance heaters.

Mr. Lynch also discussed the problem of defrosting the outdoor-air coil. Judicious use of fin spacing allowed a three to four minute defrost cycle, but improvement of this is highly desirable, he said.

He pointed out that maximum demand during the heating season usually occurs during the early morning hours when the utility company overall demand is lowest.

Adds Duct System to Experimental Home

At an earlier General Technical Meeting, Dr. Clarence A. Mills of the University of Cincinnati reported that his experimental home, *Reflective Point* has now been revised to include a duct system to clean and temper the outside air and to provide dehumidification in summer.

Reflective Point, first reported by Dr. Mills in December, 1950, is a 1700 sq ft ranch type residence in which pipe coils installed at the cove line around the perimeter of all major rooms maintain constant year 'round temperature.

Dr. Mills reported that although dry-bulb temperatures did not vary more than a few degrees, certain summer conditions resulted in extreme discomfort to the occupants due to excessive humidity. The addition of a chilled-water coil in the primary air system, which, incidentally, doubled the refrigeration load, accomplished the desired dehumidification.

Gas Storage Supplies Increasing

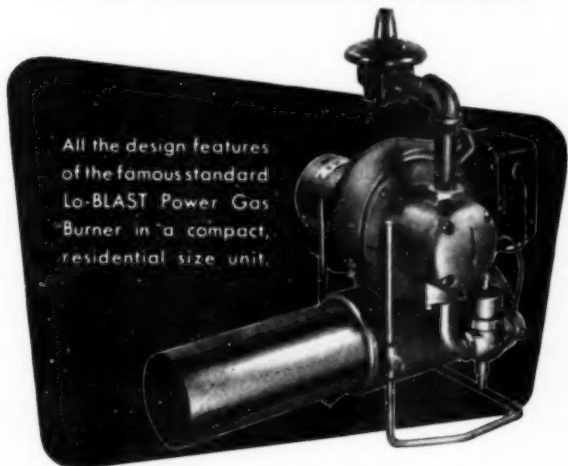
GREATER SUPPLIES of natural gas will be made available to meet growing needs for house heating next winter, particularly in northeastern and midwestern states as well as Kansas and California, according to a report presented to the American Gas Association Transmission and Storage Conference. Much of this increased volume will result from expanding capacity of underground reservoirs which soak up natural gas injected in warm weather to be withdrawn for winter use.

By the end of 1952 there were 151 underground storage pools operating in 16 states, compared with an estimated 50 pools in 11 states in 1944, according to a report made by the Committee on Underground Storage.

Existing underground storage pools, plus those being built at year's end, will have an ultimate capacity of 1574 billion cu ft of natural gas, the report stated. This compares with a record capacity of 777 billion cu ft, the maximum amount of gas in storage at any time in 1952. However, that capacity is only half the amount ultimately to be stored in those pools.

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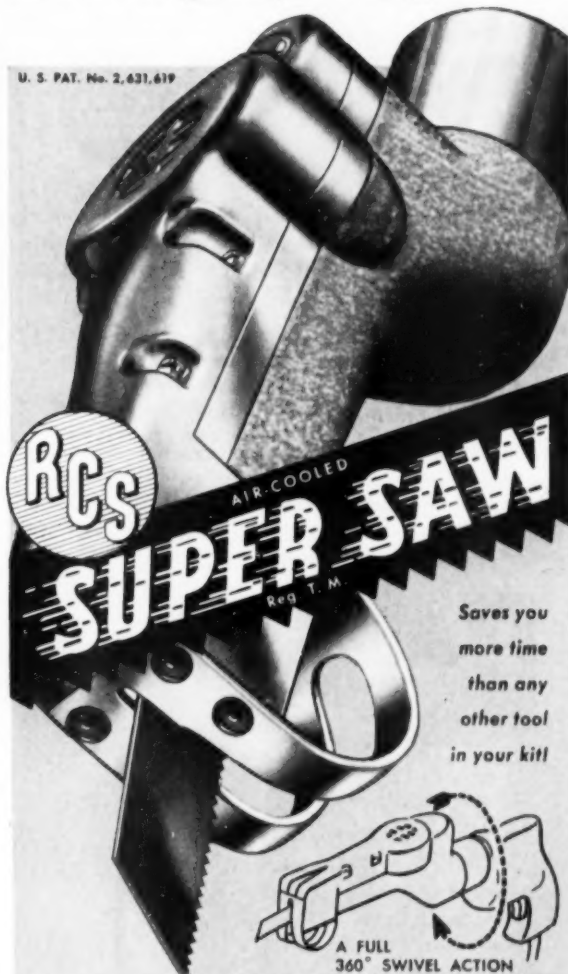
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NEW LITERATURE

Winter Air Conditioners

MODEL 300-OC oil fired counterflow winter air conditioners for utility room or closet installation are described in a two page data sheet — The Hess Co., 1855 S. 54th Ave., Chicago 50. The unit has a front vestibule with a large access door (removable for servicing). Room thermostat and standard automatic controls including two automatic heat limit safety switches are features. Rated capacity at the bonnet is 83,000 Btu at 0.75 gph input.

Oil Burner Controls

A 22 PAGE BULLETIN (GED-1832) on automatic controls for domestic oil burners contains photographs, descriptions, and diagrams of the controls; gives information on applications, operation, and mounting; and provides specifications and ordering directions — General Electric Co., Schenectady 5.

Lock Rolling Machines

TWO LOCK ROLLING machines for handling 20 and 22 gage metal are described in bulletin 353 — The Flagler Corp., 19321 Filer Ave., Detroit 34. According to the

company, a Pittsburgh type lock can be formed on 20 or 22 gage stock at 50 ft per minute, and over 1000 drive cleats per hour can be produced. Both models feature six pairs of powered forming rolls, closed end roller bearings, and gears of case hardened steel.

Space Heaters

HOW A "HEAT CURTAIN" was designed to solve the problem of cold air coming in through open doors is explained in bulletin 560-61 — Dravo Corp., 1203 Dravo Bldg., Pittsburgh 22. The booklet also explains how two combination oil and gas fired space heaters were equipped with ductwork to heat a 23,400 sq ft metal working plant.

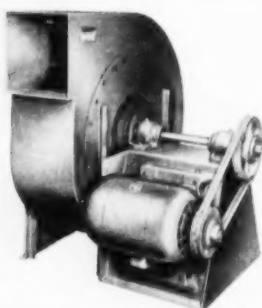
Welding Instructions

BULLETIN 466 (20 pages) presents instructions for welding hard surface materials — The Lincoln Electric Co., 22301 St. Clair Ave., Cleveland 17. Featured in the booklet are a discussion on arc weld surfacing and a chart listing the relative characteristics of surfacing materials.

Ducts and Fittings

BOOKLET ILLUSTRATES prefabricated sheet metal ducts and fittings for gravity and forced air systems — Ajax Furnace Fitting Co., 216 E. Front St., Cincinnati 2. Examples of extended plenum and perimeter loop lay-

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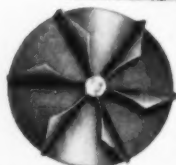
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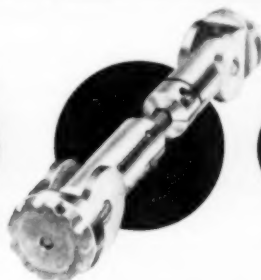
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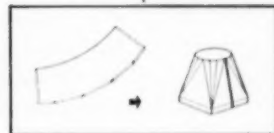
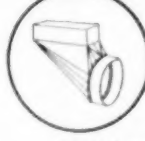
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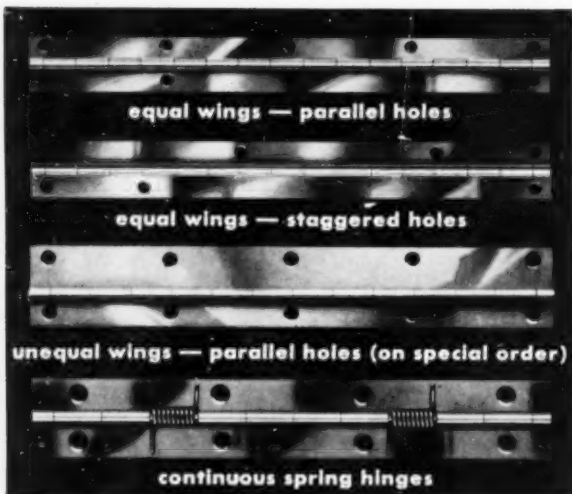
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NO SEEPAGE! NO FUMES! A powerful permanent magnet transmits float-arm action from tank to indicator . . . there are no holes in the gauge.

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out are included. Special perimeter fittings, both rectangular and round are shown attached to floor, baseboard and wall registers. Also included in the booklet are pipe and fitting weights, duct accessories and price lists.

Warm Air Conditioners

"SPACEMAKER" horizontal warm air conditioners for installation in garages, attics, crawl spaces, utility rooms, etc., are illustrated in Form JS-185 — Space Heating Div., Surface Combustion Corp., Toledo 1. In addition to application data, detailed engineering information on the components and other specification material such as performance and dimensions is included.

Aluminum Welding Processes

THE WELDING, brazing and soldering of aluminum and its alloys are detailed in a 186 page process manual, a revised edition of the manual, *Welding Aluminum*, published in 1946 — Reynolds Metals Co., 2500 S. 3rd St., Louisville 1. Thirty-four processes are shown in a chart which explains their relation to one another and indicates the processes most widely used. Address requests on your company letterhead.

Oil Burning Accessories

CATALOG describes and illustrates prefabricated metal combustion chambers for oil burners and other parts for

oil burning equipment — Oil Equipment Mfg. Corp., 169 Derby Ave., New Haven 11. Included are descriptions of slip-through tank bushings, tank gages, vent caps and stainless steel baffles. The catalog is available to all wholesalers and to dealers who include the names of their distributors with their requests.

Servicing Heating Equipment

A WARM AIR heating and air conditioning service manual offers information on various categories of equipment such as oil units, gas units, conversion burners, etc. — The Majestic Co., Inc., 733 Erie St., Huntington, Ind. Data is presented in ring binder form so that additional insertions may be made if desired. The manual is available to Majestic dealers only.

Calendar with Decimal Equivalents

CALENDAR dating from July, 1953 to June, 1954 shows decimal equivalents in 64ths from 0.015625 to 1 — Dayton Rogers Mfg. Co., 2830 13th Ave., S., Minneapolis 7. Send requests on firm letterhead.

Filter-Valve Assembly

DATA SHEET describes a fuel oil filter and four way control valve assembly designed to connect one, two, or three storage tanks to one or more gravity type burners — Unifilter Co., 29845 W. 13 Mile Rd., Farmington, Mich. The unit includes a washable wire mesh cartridge

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PERFORMANCE FAR BEYOND
AVERAGE DEMANDS

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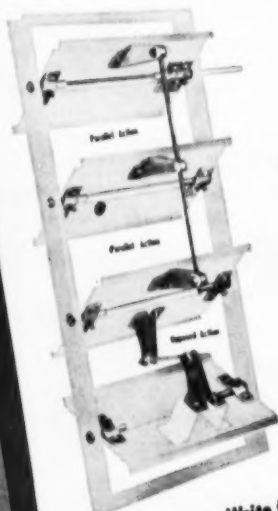
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and is self-venting. Fuel can be drawn from any one tank by turning the valve handle to any one of three inlets. As the desired inlet is opened, the remaining two are sealed.

Dehumidifiers

DEHUMIDIFYING equipment, including heavy duty, silica gel, and basement types, are illustrated in bulletin 371 — Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica 32, N. Y. Also included in the bulletin are descriptions and illustrations of humidity and temperature measuring devices and a table of recommended humidities for various industries.

Cooling Towers

BULLETIN 406-A gives features, data and dimensions of the "Thrifty-Tower", a small cooling tower for residential and commercial air conditioning systems — Marlo Coil Co., 6135 Manchester Ave., St. Louis 10. The bulletin covers all performance characteristics, and includes a data and dimension chart giving pump sizes, water flow, motor hp, shipping weight and dimensions on units ranging in size from 2 to 16 tons.

Heating Equipment Parts

REPLACEMENT PARTS for stokers and oil and gas burners are listed in a 214 page illustrated catalog — Sid Harvey, Inc., 100 E. Mineola Ave., Valley Stream, N. Y. Both new and rebuilt parts for burners are illustrated and described. Also covered are service tools, gages, test instruments, fittings, cleaning equipment, etc.

Material Handling Equipment

MATERIAL HANDLING equipment is described in a 100 page pocket size catalog (No. 535).—Barrett-Cravens Co., 4611 S. Western Blvd., Chicago 9. Illustrations and specifications are included for fork trucks, high lift electric trucks, pallet trucks, etc.

Oil Burner Accessories

INFORMATION on oil burner accessories, including nozzles, air cones and stabilizers, air mixing equipment, combustion heads, valves and strainers is contained in catalog O (12 pages) — Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34. The booklet is illustrated throughout with cutaway photographs and diagrams. Included are tables on nozzle dimensions and capacities, recommended combinations of air cone and stabilizer equipment, and nozzle and fire box data for air mixing equipment and combustion heads.

Oil Fired Furnaces

RESIDENTIAL and commercial oil fired furnaces are described and illustrated in two four page circulars — Quiet Automatic Burner Corp., 33-35 Bloomfield Ave., Newark 4. Models are available in capacities ranging from 70,000 to 1,000,000 Btu per hr.

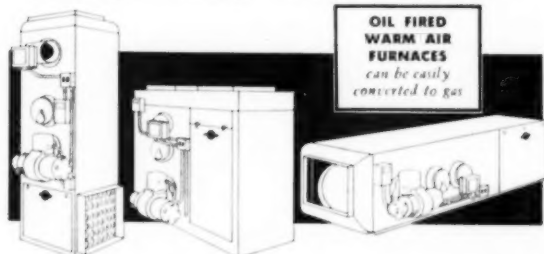
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HORIZONTAL Summer AIR CONDITIONERS

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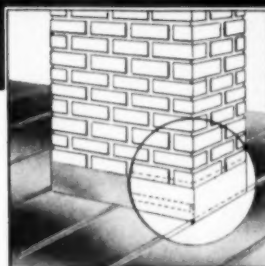
Available in 2, 3 and 5-Ton units.

"Only the BEST goes into a BESSER!"

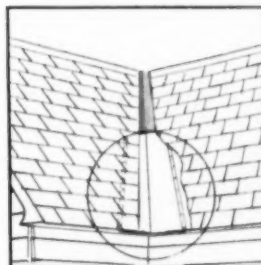
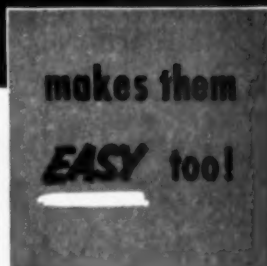
BESSER WARM AIR FURNACES
Summer AIR CONDITIONERS
The Complete Line for Year-Round Profits

BESSER METAL PRODUCTS CORP., P. O. BOX 4064, CHARLOTTE, N. C.

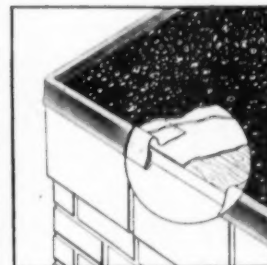
WEATHERSEALING JOBS ARE *PROFITABLE...* FOLLANSBEE TERNE METAL



Continuous Chimney Flashings



Valleys



Gravel Stops

There are big profits to be made in weathersealing any type of roof—especially when you use Follansbee Terne Metal. Because of its greater ductility, installation can be made more easily. The tightly bonded coating of terne will not flake or peel in the most difficult seaming operation.

Follansbee Terne Metal will bond with other metals without setting up any serious electrolytic action. Available in 50 foot rolls, without cross seams, that can be cut to any required length.

Follansbee Terne Metal is carried in stock nationally by all leading sheet metal distributors.

• 40 lb. coated Follansbee Terne Metal
Roofing is available now!

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES, PITTSBURGH 30, PA.

Cold Rolled Strip

Seamless Terne Roll Roofing

Polished Blue Sheets and Coils

Sales Offices—Chicago, Cleveland, Detroit, Indianapolis, Kansas City, Los Angeles, Milwaukee, Nashville, New York, Philadelphia, Rochester, San Francisco, Seattle, Toronto and Montreal, Canada.
Mills—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES

Pittsburgh, Pa. Rochester, N. Y. Fairfield, Conn.



At Last!



**HERE'S A
COMBINATION
HEATING
and
YEAR 'ROUND
AIR
CONDITIONING
PACKAGE**

*designed
especially
for*

**MODERATE
PRICED HOMES!**



MODEL CA-275

Brief Specs.

Dimensions 20" x 30" x 76". Oil or gas fired.
For forced warm air with blower of 800 c.f.m. having 10" wheel.
Boiler cap. 75,000 BTU/hr.
Hot water heating coil cap. at 200°-210° F., 75,000 BTU/hr.
Cooling cap. 23,985 BTU/hr.
Cooling system remotely installed with 2 h.p. Copelametic air cooled unit.
Accessible, hermetically sealed unit with cooling coils 3 rows deep.

NOW you can sell "year 'round comfort" for only a little more than for heating alone. Here's something new to feature for basement or utility room installation.

INQUIRE for complete information, prices and delivery on this Vikimatic Model CA-275 today.

Ask about this Vikimatic

"MOBILE" water cooled ROOM COOLER for homes, offices.
¾-ton or 1½-ton capacities.
Not just a room "fan" but a really portable room cooler. Plugs in anywhere.



Also

inquire about this highly saleable Furnace or Boiler Package Air Conditioner.

Three compact models for installation with warm air or hot water system.

**It heats!
it cools!**



**WARM IN WINTER
COOL IN SUMMER**

Cooling and year around air conditioning . . . Central heating for coal, oil, gas . . . Fin type baseboard radiation . . . FLATPAK aluminum ductwork.

THE VIKING MANUFACTURING Corp.

1747 Chester Ave.

Cleveland 14, Ohio

we hear that . . .



THE WARM AIR school held by the Inland Supply Co. at Danville, Ill., was attended by 35 dealers from central and eastern Illinois and western Indiana

TWO WARM AIR schools — one in Danville and one in Mattoon, Ill. — were recently sponsored by the Inland Supply Co. for the purpose of acquainting dealers with the fundamentals of warm air perimeter heating. Speakers at the Danville meeting were Clarence Grandstaff, chief application engineer, and Maurice Klett, vice president, The C. A. Olsen Mfg. Co., and H. Thomas, district manager, Johns-Manville. Brye Radebaugh, Mattoon branch manager, Inland Supply Co., was in charge of the meeting at Mattoon.

FIRST OF THE HOMES in an all air conditioned development at Anderson, S. C., has been completed. The house, a six room model selling for \$13,800, has year 'round air conditioning furnished by a Carrier Corp. "Weather-maker" unit. The Anderson development is the first of 17 similar projects planned for construction in various southern states.

THE SAUER CO., INC., heating and ventilating contractor in the Columbus, Ohio, area, is being merged with the Limbach Co., Pittsburgh. Joseph Zellak, general manager of the Columbus firm, continues as executive head.

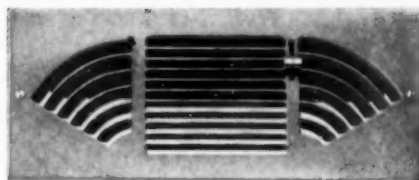
A SERIES OF 13 FILMS designed for motion picture and television advertising of residential gas, oil and coal fired automatic heating equipment has been produced by Iron Fireman Mfg. Co. Films solely for TV presentation run 20 seconds, including the dealer's signature; films for either motion picture or TV showing run 40 seconds, including the dealer's signature. Arrangements for viewing the films may be made through the company's advertising department, 3121 W. 106th St., Cleveland 11.

A RANCH TYPE display home in West Knolls, near Kalamazoo, Mich., featuring air cooled residential air conditioning, was recently opened to the public. Year 'round air conditioning is furnished by a Chrysler Air-temp air cooled air conditioning unit combined with an oil fired lowboy furnace. Outside air used to cool the refrigerant is drawn from the home's attached garage and attic. An opening day crowd of about 5000 persons visited the home, the first of 23 scheduled for construction.

Announcing the new A & A "Rainbow Design"

(Another development by George G. Auer)

**... TO SOLVE YOUR
SMALL PIPE, HIGH
VELOCITY REGISTER
PROBLEMS**



"Rainbow Design" No. P 26

This attractive new design adds modern beauty to modern homes and is engineered for greater heating efficiency. Special gasket seal eliminates wall streaks. May be ordered with or without valve.



Write or call today for detailed information and ask for your copy of the new A & A Catalog showing our complete line of wall and floor registers.



Your best buy every time.

THE A & A REGISTER COMPANY
8327 CLINTON RD. CLEVELAND 9, OHIO

THIS AMAZING NEW BETT-MARR outperforms sheet metal saws costing six times as much

For faster, smoother, more accurate cutting of galvanized sheet metal, there's nothing better than a Bett-Marr—yet, it actually costs so little, no shop can afford to be without one.

The all-cast frame of the new, improved Model 14 SM assures the utmost in stability and accuracy and reduces vibration to a minimum.

CUTS 50 to 70 STACKED SHEETS—of galvanized sheet metal up to 15 inches per minute. An all purpose 14 inch bandsaw with lifetime sealed precision bearings.

SMOOTH, POWERFUL CHAIN DRIVE—Blade speeds from 125 to 2200 FPM quickly adjustable for metals, plastics, wood, castings or forgings.

POSITIVE BLADE CONTROL—Case hardened guides with carbon back-up bearing (adjustable up to 1/2" blade width) assure accuracy. Flanged wheels control blade for perfect radius and straight line cuts.

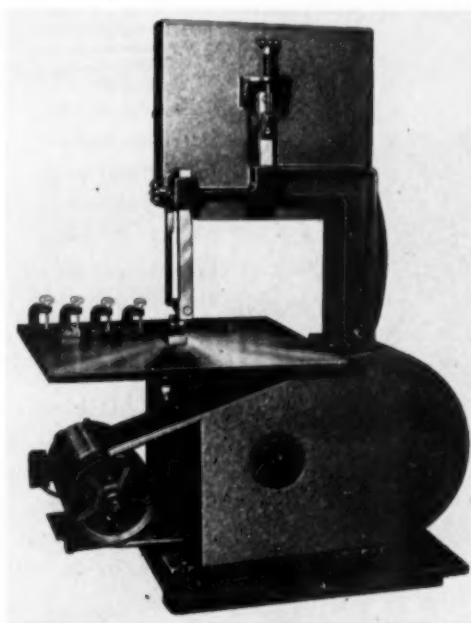
BETT-MARR MFG. CO. HOPKINS, MINNESOTA

- ☐ Please send me more information on the Bett-Marr sheet metal saw
☐ Where can I buy a Bett-Marr

Name

Address

City Zone State



Shown above
MODEL 14 SM*

Depth of Cut 8 1/4"
Blade to Frame 13 1/2"
Table Size 20x22"
Overall Depth 34"
Blade Length 97"

*Includes set of 4 sheet metal clamps and riser bar insert to match for sheet metal work.

MAIL COUPON TODAY . . . GET THE AMAZING FACTS

Learn how you can cut production costs with a Bett-Marr sheet metal saw. It pays for itself quickly in both large and small shops. (Equipment dealers—write for information on available territories.)



If you are using or contemplating the use of heat-resisting stainless steels for combustion chambers for oil burner furnaces, we are specialists in producing these types of steels.

Whether you are a large or small user of these steels, our facilities can offer exceptional service by especially shearing to your specified combustion chamber blanks, or multiples thereof.



Ingersoll STEEL DIVISION
 BORG-WARNER CORPORATION
 310 South Michigan Avenue, Chicago 4, Illinois
 Plant: New Castle, Indiana

we hear that . . .

tion in the area. The homes will be priced at approximately \$25,000.

Charles R. Beltz & Co., 11029 Whittier Ave., Detroit, has installed two 5 hp Chrysler Airtemp air conditioners in the zoned heating and cooling system of a Detroit funeral home. One half of the building, occupied by the chapel, forms one heating-cooling zone; two second floor parlors, a third parlor downstairs, and the general business office comprise a second cooling-heating zone. The air conditioners installed in the basement are controlled by individual upstairs thermostats. When either of the areas is not in use, it may be closed off, and one of the air conditioners turned off.



ATTENDING THE Ward Machinery Co. business conference were (l. to r.) W. M. Ward, J. A. Schaefer, N. H. Matson, A. P. Schneider, C. A. Emerson, J. D. Jensen, Wm. Heim, D. Sullivan and F. Taturo

WARD MACHINERY CO. recently held a business conference at the Lake Shore Club, Chicago, attended by executives of Dreis & Krump Mfg. Co., Whitney Metal Tool Co., and Service Machine Co., whose products are distributed by Ward.

AN OIL BURNER assembly line, designed to produce 400 units a day, was recently placed in operation at Wayne Home Equipment Co., Inc. An overhead conveyor carries cast aluminum fan housings and steel air tubes through the painting department to the assembly line. Assemblymen then join fan housings and motors on a conveyor belt fixture which moves the units through stations where other components are added. Company officials report that the 700 per cent increase in 1953 demand can now be met with added production available through the new facilities.

THE TORRINGTON MFG. CO. has started construction of a half-million dollar plant addition. The new building, which will provide 46,125 sq ft of additional floor space, is expected to be completed before the end of the year.

THE CHATTANOOGA, TENN., sales office of The Trane Co. has been moved to 308 S. Kelley St.

THE AUTOMATIC CONTROL and Uni-Flo divisions of the Barber-Colman Co. recently opened two new factory branches, one in Syracuse, N. Y., and the other in Jacksonville, Fla. The manager of the Syracuse office, at 218

NOW even the Smallest Shop can SLASH SHEARING COSTS

with the fast new
precision-engineered

WILDER JUNIOR METAL SLITTER

- No gadgets to fool with
- No other expensive equipment tied up ● Trouble free
- Speed 73.3 fpm. Wt. 118 lb. Tolerance .005"

Features 2 power driven, hollow-ground edge, high carbon, high chrome tool steel blades
Oil impregnated porous bronze bearings

Specifications

Speed of cut—73.3 feet per minute
Gage capacity—20 gage mild steel and lighter
Horsepower—1/3 — 110 V — Single phase — 60 cycle
Shearing Width—1 1/4" to 24 1/4" to any length
Length—front to back—38" Width—less gage overall—28"
Width—head frame—8 3/4" Width—gage length—40"
Height—overall 43" Height—to shear line—36"
Weight—net—118 lb. Weight—crated—138 lb.



For complete information ask your jobber
or write

Route 2 Box 880
Carmel, California

WILDER
MANUFACTURING CO. INC.

LOOKING FOR WALL BASE HEATING FOR WARM AIR FURNACES?

GET BRANDES!

Sell Brandes — the wall base heating that's designed for forced warm air systems. It's easy to install — spreads heat evenly to blanket the entire wall — low in cost! Let us give you complete facts and figures — write today!

BRANDES COMPANY

2046 Winnebago

MADISON 4,

WISCONSIN



- ★ BIGGER PROFIT
- ★ EASY INSTALLATION
- ★ LOW COST

*The First, and Patented

we hear that . . .

Harrison St., is K. C. Watson. D. W. Minick will manage the Jacksonville office, at 1143 Mary St. Both offices will handle the sale and service of automatic control and air distribution products.

OVER 70 dealers and salesmen attended the recent schools on perimeter heating sponsored by the heating department of Farwell, Ozmun, Kirk & Co. P. E. Anderson of the heating department was in charge, assisted by C. L. Grandstaff, engineer, and M. Klett, vice president, the C. A. Olsen Mfg. Co.

A COMPLETELY AIR conditioned home especially designed for southern California locations was recently on display at the 1953 Home Show in that area, according to the Southern California Gas Co. The house was designed around the air conditioning unit, which provides heating or cooling as required.

DETROIT REGULATOR Co. has changed its name to Maxitrol Co., and has moved to a new plant located at 12200 Beech Rd., Detroit.

THE HEIL Co. recently introduced its new dealer marketing aids kit at a local dealer meeting in Milwaukee. These kits, available to dealers through Heil wholesalers,

include an assortment of newspaper ad mats and radio spot announcements, samples of promotional literature, descriptions of advertising aids available to dealers, and a number of other selling tools.

A NEW MID-ATLANTIC regional office has been opened by Minneapolis-Honeywell Regulator Co. on West Hunting Park Ave., Philadelphia. Sales, service, and engineering departments are housed in the new building.

APPROXIMATELY 100 dealers attended the recent meeting held by the Lennox Furnace Co. at Salt Lake City. Principal speaker was John W. Norris, president, who discussed year 'round air conditioning units and gas heating equipment recently added to the company's line.

THE AUTO-HEAT CORP. has been sold and reorganized as The Robot Auto-Heat Corp. Officers of the new firm are: president, George Guite; vice president, William Christians; secretary and factory manager, Andrew Jensen; and treasurer, Ernest Leonard. Otto Moody, former owner, will continue with the company as sales manager. Plant expansion currently under way will add approximately 6000 sq ft of production and warehouse space.

AIR CONDITIONING is being offered as an optional feature at an additional charge of \$900 in houses in a 224 family private home community in Long Island. The homes,

ONE doesn't fit ALL needs!



Get *Airsan* Filters ENGINEERED TO FIT THE JOB — RIGHT EVERY TIME

No filter does all jobs, meets every need. That's why Airsan Filters are engineered to the job to offer more effective dust collection. Airsan's expanded metal face plate acts as a lint arrestor to provide easier cleaning and servicing. It distributes air easily over the entire filter area. Provide high filtering efficiency and dust holding capacity with less resistance. Features include all galvanized construction and full bronze welded corners. Write for data.

Send for Free Bulletins

Air Filter Corporation

108A NORTH WATER ST. • MILWAUKEE, WIS.
Canadian Representative
DOUGLAS ENGINEERING CO., LTD., MONTREAL

A Few Distributorships Available. Write for Details!

AIR FILTERS

(Low Velocity)

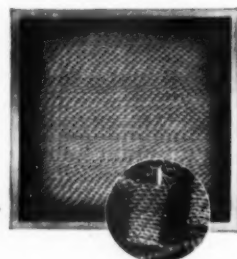
Viscous type, permanent and cleanable designed for industrial, commercial and domestic use. Available in 1" and 2" thickness.



VIRO-CRIMP

(High Velocity)

Has a specially designed high velocity Viro-Crimp filter core. Hemmed edges provide a safety feature. Operates efficiently at 300 to 500 fpm. Available in 2" and 4" thickness.



GREASE FILTERS

Permanent, cleanable type Airsan Grease Filters made especially for range canopies, galleys, kitchens. Available in 2" thickness.





Grant Wilson DUX-SULATION

(ASBESTOS-PROTECTED)

Sure the initial cost of DUX-SULATION is high — but figure the "Extras" and Labor involved in using other duct insulations and you will see "Why" DUX-SULATION actually costs you less. DUX-SULATION gives high Thermal Insulation on Heating or Cooling ducts and reduces noise-travel at the same time. DUX-SULATION saves your client money and you trouble. Here are just a few reasons "Why" you will want DUX-SULATION on all your jobs.

1. DUX-SULATION comes COMPLETE with Adhesive, Asbestos Tape and instructions for fast, attractive and secure Installation. There are no Extras to buy, or lugs, clips or screws to fasten to the duct work. A DUX-SULATION insulated job is not full of holes — there are no gimmicks and gadgets to come loose, rattle or cause Condensation which lowers the efficiency of the system.

2. Heating, Cooling and Ventilating duct work can even be insulated in the shop and transported to the job without harm. DUX-SULATION'S strong, flexible construction will not sift, shift, crumble, powder, mat down, deteriorate or pull apart on the duct work.

3. DUX-SULATION is safe and easy to handle. It contains no irritating or skin infecting substances. You can be sure of a complete, PERMANENT, high Thermal and Acoustical efficiency when you insulate with DUX-SULATION.

There are many more valuable features about asbestos-protected DUX-SULATION described in our Free Sample Kit (No. 538-A). Write: GRANT WILSON INCORPORATED, 141 WEST JACKSON BLVD., CHICAGO 4, ILLINOIS today. Learn more about DUX-SULATION and "Why" it's worth more than its slightly higher initial cost. See our Catalog No. 10a W1 in Sweets File.

Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS

YOUR **BEST** BUY

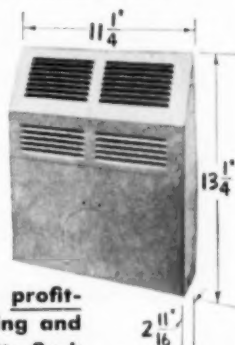
for Warm Air Installations!

NEW G/A DIFFUSER MINIMIZES COLD AIR RETURNS

The NEW General Automatic TEMP-RD AIR DIFFUSER makes installations quick and easy . . .

and, therefore, extra profitable! Eliminates all cutting and framing! Register box fits flush with the wall surface . . . the only openings necessary are in

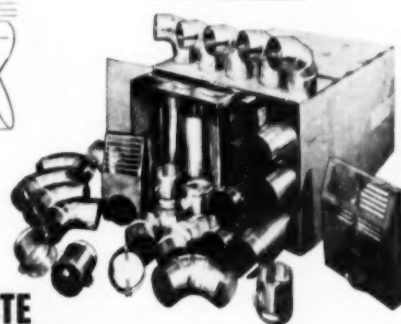
the floor, to make duct connections. Special design minimizes the use of cold air returns by circulating air within the rooms.



NOW
COMPLETE
REGISTER
ONLY . . .

\$3.80

Trade List
each
(F. O. B.
BALTI-
MORE)



COMPLETE READY-TO-INSTALL PACKAGES AVAILABLE!

You can now order General Automatic Temp-RD Air in the profitable factory package shown above. Shipped complete and ready to install! Contains all necessary material . . . including Diffusers, furnace bonnet assembly, necessary pipes and connections, and COMPLETE COLD AIR RETURN GRILL. Simplifies ordering procedure and greatly reduces storage space. WRITE TODAY FOR FULL DETAILS!



2300 Sinclair Lane
Baltimore 13, Md.
Representatives in principal cities

CONNOR

ENGINEERING
CORPORATION

kno·draft®

adjustable air diffusers

Get your
JOB OK's
QUICKER

Contractors everywhere report faster installation and faster job O.K.'s with Kno-Draft Adjustable Air Diffusers. Mechanical simplicity is the answer. And Kno-Draft Diffusers are adjustable *after* installation.

To install Kno-Draft, simply attach outer cone to duct and fasten preassembled diffuser unit to three suspension bolts. A few twists of a screwdriver adjust air direction to any discharge angle from horizontal to vertical. Single annular air stream permits direct volumetric reading. Damper is regulated by hand screw.



1 Easy Installation



2 Easy direction set



3 Easy balancing



4 Easy volume set

CONNOR ENGINEERING CORP.

Danbury, Connecticut

Also Manufacturers of
Dorex Air Recovery Equipment



● NEW EDITION! Kno Draft Data Book now in new 32-page format. Complete, up-to-the-minute specifications, engineering and installation data on Kno-Draft Adjustable Air Diffusers. Bring your files up to date. Mail coupon today.

CONNOR ENGINEERING CORP.
Dept. S-83, Danbury, Conn.

Please send me the new edition of the Kno-Draft Data Book—without obligation, of course.

Name _____
Position _____
Company _____
Street _____
City _____ Zone _____ State _____

we hear that . . .

in the \$13,000 to \$14,000 price class, are air conditioned the year 'round by United States Air Conditioning two-ton air conditioners operating in conjunction with "Luxaire" oil fired forced warm air furnaces.

GENERAL ELECTRIC Co. has opened heat pump sales branches in Los Angeles and Chattanooga. The company plans to open similar branches in areas where it is not now represented by distributors with experience in the engineering of heat pump applications.

APPROXIMATELY 500 dealers and service men recently toured the plant of Sid Harvey, Inc. A discussion on servicing low pressure oil burners followed. Various cutaway models and slides illustrating the internal workings of the burners were used to explain servicing procedures.

THE A & A REGISTER Co. has started construction on a new addition to its plant to provide more shop space and more room for steel storage.

GENERAL CONTROLS Co. is building a 120,000 sq ft plant in Burbank, Calif. The new plant, scheduled for completion in late summer, is located at Alameda and Flower Sts.

THE WARM AIR and domestic hot water furnace originally called "Metropac Junior" has been renamed as a result of a nationwide contest conducted by the Metromatic Mfg. Co. New name is "Metropac Challenger."

A NEW BUILDING has been constructed by The Waterman-Waterbury Co. to provide space for enlarged processing facilities which include U-shaped vats for submerging casings of furnaces and air conditioners prior to treating them with a corrosion resistant paint base.

ROBERTS-GORDON Appliance Corp. is offering a set of direct mail pieces for use by its jobbers and dealers. Included in the promotional package are pieces on gas fired winter air conditioners, unit heaters, and spreader flame conversion gas burners.

SET SCREW & MFG. Co. has acquired from the Shakeproof Div., Illinois Tool Works, the facilities for the manufacture and sale of a line of offset self-locking set screws formerly marketed by Shakeproof.

THE ALUMINUM ASSOCIATION is offering a 16 page booklet, *Employment Opportunities in the Aluminum Industry*, outlining the different types of personnel required and the training needed to fill these positions. Copies may be obtained from the association at 420 Lexington Ave., New York 17.

"Made-Rite" fittings Save job TIME!



One sure way to **KEEP** down job time is to check on assembly time for warm and cold air runs. If your figures prove it excessive, then it's time to check with us. We can offer you a superior line of furnace fittings which will cut installation time to a minimum, and free your help for more jobs in less time.

We're equipped, too, for recoiling, and slitting and shearing metals 14 gauge or lighter and up to 36" wide. Prices quoted on receipt of your specifications

"Made-Rite" Co., Inc.

Manufacturers & Suppliers
Furnaces — Pipe and Fittings

10th and Monroe St.

Newport, Ky.

Don't Be Extravagant

USE CHINC

FOR SHEET-METAL WORK FOR THRU-WALL FLASHING

A non-rusting alloy of copper and zinc that costs about 40% less than copper, gauge for gauge. CHINC was tested by the Bureau of Standards—Approved by Federal Housing Authority—Accepted by U. S. Engineers—Millions of feet used all over the U. S. A. In three standard gauges.

ROLLS — SHEETS — THRU-WALL FLASHING

CHINC	#10 (.012")	equal in thickness to	10 oz. copper
CHINC	#16 (.020")	equal in thickness to	16 oz. copper
CHINC	#20 (.025")	equal in thickness to	20 oz. copper

EASY TO WORK — EASY TO SOLDER

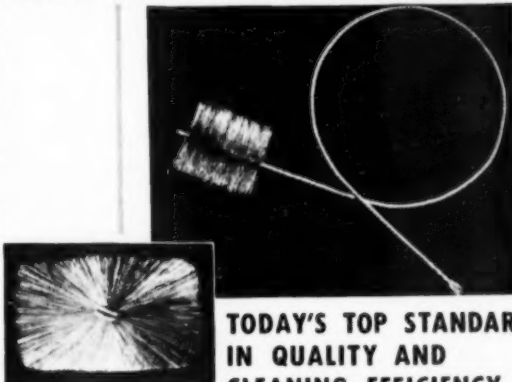
EASY ON THE POCKET BOOK

Send for Samples and Prices

CHENEY FLASHING COMPANY

TRENTON, NEW JERSEY

SCHAEFER FLUE AND FURNACE BRUSHES



**TODAY'S TOP STANDARD
IN QUALITY AND
CLEANING EFFICIENCY**

RECTANGULAR WIRE BRUSHES with HANDLES

Specially developed "Silver Brite" Rustproof Wire means longer wearing, better cleaning, with these Schaefer brushes. In three sizes with 4-foot wire handles. Also available in black oil tempered wire. Write for special prices and complete catalog No. 650 on Schaefer Boiler and Furnace Brushes.

LOOK for the trademark

SCHAEFER BRUSHES
— MILWAUKEE —

SCHAEFER BRUSH MFG. CO.

117 W. WALKER STREET • MILWAUKEE 4, WIS.

**BUY SCHAEFER
...IT'S SAFER**

Save Time...Labor...Material with BEVERLY

metal cutting SHEARS

throatless SHEARS

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3, 16".



Inside SLOTTER

Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H C H C blades.



slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models—cap. to 3/8"; trimming capacity to 1/4" mild.

See your Beverly Distributor. Write for FREE illustrated Bulletin.

Beverly SHEAR MFG. CO.

3020 W. 111th STREET • CHICAGO 43, ILLINOIS

The "Inside Story" of SIEMON As a High-Speed Heat Exchanger Power-Flame Heat Exchanger SUPERIORITY

Power-Flame units (all models) are shipped completely assembled with controls wired. Just connect power and gas lines.

Quiet, amply-sized blowers provide balanced air mixture for very high heating plant efficiency.

Controls burner mounted and tested. Installation cost reduced to a minimum.

Motors amply-sized and properly applied bring to Siemon users a lifetime of trouble-free service.

Lighting made easy. Push button runner pilot on smaller capacities. Electric ignition on larger models.

Balanced air adjustment. Precision built to provide metered air for complete combustion.

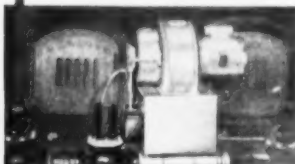
"Tube within a Tube" design. A Siemon exclusive means quietness and very high efficiency.

STAINLESS STEEL DEFLECTORS provide final blending of fuel mixture—eliminating pulsation.



The GAS Conversion Burner Engineered for "Hard to Fire" Applications

Forced-draft design reduces to a minimum the problem of natural drafts. Perfect intermixing of air and gas results in real fuel saving. Highly efficient in down-draft heating plants. Gun-type design permits installation in a minimum of space.



Another example of Power-Flame versatility. This installation made over a coal stoker.



Models in capacities from 85,000 to 3,000,000 B.T.U. input. All units are completely packaged and gun-type design. Installation costs reduced to a minimum.

You owe it to yourself to get the facts about Siemon's "profit plan." Write today for literature and information about Power-Flame Gas Conversion Burners.

Siemon
Power-Flame
BURNER

Siemon Manufacturing Co.
1819 Holmes
Kansas City, Missouri

appointments . . .

F. W. LEGLER as a vice president of the Waterman-Waterbury Co. Mr. Legler is manager of the company's New England division and has moved his headquarters to South Boston, Mass. He has been with Waterman-Waterbury since 1919, and was president of the Waterbury Co., the Minneapolis Waterbury dealer, from 1937 to 1948.



F. W. Legler



E. M. Toussaint

E. M. TOUSSAINT as general manager of the Controls Div., Minneapolis-Honeywell Regulator Co., with headquarters in Los Angeles.

RAY BOLAND as sales representative for Jackson and Church Co. in the Baltimore-Washington, D. C., area.

ROBERT V. MAIN as sales manager of the Blower Div., Viking Air Conditioning Corp. Previously Mr. Main was engaged in public relations and market development work for Marvin Helf Inc., builder and general contractor.



R. V. Main



J. A. Norris

JAMES A. NORRIS as head of the Los Angeles office and warehouse of Imperial Brass Mfg. Co., serving the southern California and Arizona territories. He will be assisted by Chester Weinert.

FRANK ROW as southern regional manager and J. P. Parker as northern regional manager for the Liquefied Gas Products Div., A. O. Smith Corp. Mr. Row's headquarters will be in Houston; Mr. Parker's offices will be in Chicago.

HARRY L. WILLIAMSON, JR., as manager of marketing of the General Electric Co.'s heat pump department. Mr.



"NO... HE'S THE ROYAL-JET DEALER." We don't promise you the riches of a Rajah, but an active dealer can certainly make an extra buck with Royal Heaters. Why don't you give us a ring, today? Call collect, Cumberland 3-2117, Royal Heaters, Inc., Alhambra, Calif.

YOUR BEST INVESTMENT LEVER **WHITNEY** PUNCHES

**GOOD TOOLS
HELP YOUR
MECHANICS
DO BETTER
WORK...**

**AND YOU
CAN'T BUY
BETTER TOOLS
THAN OURS!**

Please Write
Today For
Literature

See Your Jobber.



NO. 8-B PUNCH

Capacity $\frac{1}{4}$ " hole through $\frac{1}{4}$ " iron
Length 18 $\frac{1}{2}$ " Wt. 7 $\frac{1}{2}$ lbs. Depth of throat 2"
Punches and dies $\frac{1}{16}$ " to $\frac{7}{16}$ " by $\frac{1}{64}$ "



NO. 2 PUNCH

Capacity $\frac{5}{16}$ " hole through $\frac{1}{4}$ " iron
Length 25" Wt. 14 lbs. Depth of throat
 $1\frac{1}{16}$ "
Punches and dies $\frac{3}{32}$ " to $\frac{1}{2}$ " by $\frac{1}{64}$ "



WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

WEBCO

the portable

SHEET METAL BENDING BRAKE



The WEBCO brake offers the Slip End, Sliding Folding Fingers, and many other important features. The WEBCO will make bends up to 52°. Write for detailed information to:

HALLMOR INC.

McMURRAY ROAD
BRIDGEVILLE, PA.

WE ROLL RINGS

Expertly Rolled to your specific requirements, — also Channels, Tees, Flats, Rounds, Pipe and Tube — correctly rolled to a true circle. Used in joining pipe or smoke stacks sections; reinforcing tanks, vats, drums, guards etc.; bases for fans and hundreds of other installations.

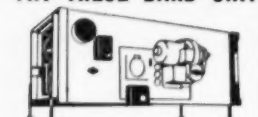
Write for our list of stock sizes and discounts. Our circular, describing our angle rings and fabricating services is yours for the asking.

Phone Bishop 7-4255

**NATIONAL
METAL FABRICATORS**
2140 SO. SAWYER AVE.,
CHICAGO 23, ILL.

BARD MULTI RADIATOR WARM AIR HEATING

TRY THESE BARD UNITS ON YOUR NEXT JOBS



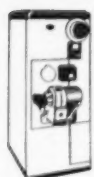
85,000 BTU OIL-FIRED
For attic, ceiling suspension or crawl-space. Low cost.



**70,000 BTU
GAS HI-BOY**

Perimeter or utility system for conventional or counter-flow installations. Low cost.

TOPS IN PROFIT AND CUSTOMER SATISFACTION



**85 TO 110,000 BTU
OIL HI-BOYS**

Perimeter, conventional and counter-flow systems. Install anywhere. Top performance.



**ALL TYPES
AND ALL
SIZES OIL
OR GAS
WINTER
CONDITIONERS**

Known everywhere as the industry's best \$ values.

WRITE FOR CATALOG AND PRICES

BARD MFG. CO. BRYAN, OHIO

**our
ELBOWS
have all the
good points**



**CONDUCTOR
PIPE ELBOWS
AND SHOES**

- All Sizes
- All Metals
- All Angles
- All Gauges

**SEE YOUR
JOBBER**



The CINCINNATI ELBOW CO.
2021 EASTERN AVE. CINCINNATI 2, OHIO

appointments . . .

Williamson was formerly manager of advertising and sales promotion of a company department in Baltimore. H. H. Falkingham and W. H. Grant have been appointed home heating and cooling sales representatives of the company's air conditioning division. Mr. Falkingham's territory covers Kentucky, southern Indiana and part of western Ohio. Mr. Grant's territory includes Michigan and northern Indiana.

KELL T. TODD as plant manager of the Kennard Corp. Mr. Todd received his training in engineering and factory management at Washington University.



K. T. Todd



Wm. Lane

WILLIAM LANE as advertising manager of the Van-Packer Corp. Mr. Lane has been with the company since 1949. William Collins, formerly a division sales manager, has been appointed assistant to K. W. Mayer, vice president in charge of sales. Wayne Bradfield was named sales promotion manager.



Wm. Collins



W. Bradfield

ASHBURN SUPPLY CO. as southern California distributor of the new line of forced air furnaces being manufactured by Day & Night Div., Affiliated Gas Equipment, Inc.

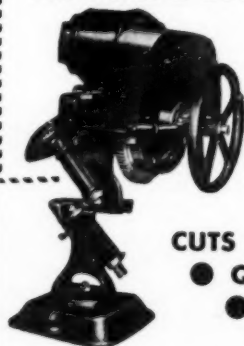
JOHN M. SIBARIUM, Whitestone, N. Y., as direct factory representative for the Oil Heating Supplies Div. of Boston Machine Works Co.

SPIEGELS, INC., Chicago, as distributor of room air conditioners for Quiet Heat Mfg. Corp. Other new distributors for the company's line of room air conditioners are: W. W. Grainger, Inc., Chicago; Airtex Corp., Chicago; Cutlers Exchange, Nashville, Tenn.; and The Sutton Electric Supply Co., Wichita.

THE RIGHT SHEARS FOR ANY CUTTING JOB

MARSHALLTOWN

ROTARY THROATLESS SHEARS



CUTS ALL SHAPES—SIZES

- QUICKER
- EASIER
- FASTER

Here's a shears that's right for every job. Speedy — efficient. Cuts up to 1/4 inch stock — speed to 6 ft. per minute. Excellent for irregular cutting or straight splitting. Available in hand operated or motorized models. Prompt shipment. Send today for special illustrated bulletin.

MARSHALLTOWN MFG. CO.

Marshalltown,

Iowa



Sell

Humidification

and Reap a Profit from MONMOUTH

Busy months are ahead — months when you will be servicing old and installing new warm air heating furnaces. You can make extra profits in these active months by talking controlled humidification to home owners — by selling them on increased comfort, better health, lower fuel costs.

Monmouth Humidifiers install quickly in any warm air furnace — capacities up to 420,000 B.T.U.

All employ Monite fast diffusion plates and time-tested non-corroding Flotrol or Microfeed controls.

They will meet every claim — build good will for you. Complete information sent on request. Write NOW.

CLEVELAND HUMIDIFIER CO.

7802 Wade Park Avenue

Cleveland 3, Ohio

**MONMOUTH
HUMIDIFIERS**

FROM
THIS

... TO
THIS

So EASY

with Lock-On-Grip!

No. 8, 8" \$2.95

WISE-GRIP
SHEET METAL
TOOL

Positively the *fastest*, *EASIEST* metal-working tool you can use! A squeeze of your hand applies tremendous *lock-on* grip—for bending, crimping, straightening, seaming or forming. Adjusts in a jiffy to super-pliers action. Deep 1 3/4" reach. Tool quickly adjusts to any size work. Think of all those *tough* jobs—made easy by no more tiresome hand gripping! See your supplier soon. Only \$2.95 will buy you a work-saving, time-saving Vise-Grip.

By Maker of the Famous VISE-GRIP Wrench
PETERSEN MFG. CO., Dept. AA-8, DeWitt, Nebr.

E-Z-ONS CLINCHING ACTION

for Positive,
Quick and Easy
Installation

- ★ E-Z-ONS two claw-like prongs clinch and grip from opposite directions to assure a tight fit.
- ★ One blow permanently rivets — not 3 or 4 operations.
- ★ E-Z-ONS will not swivel or loosen.
- ★ E-Z-ONS eliminate sheet metal screws, rivets or washers — none to use — none to lose.

Leading Jobbers Stock E-Z-ON.

STANDARD
E-Z-ON
DAMPER REGULATOR

M.A. GERETT CORP.

722 WEST WINNEBAGO STREET, MILWAUKEE 5, WISCONSIN

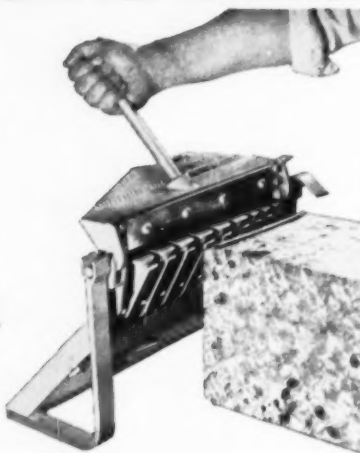
FLANGES THE DUCT

IN LESS THAN
5 SECONDS

Works like a bar-
folder with a new
twist.

Handling the
work back and
forth has been
eliminated by a
unique manipula-
tion of the bender
itself.

"Best
little tool
in the shop"



No money tied up in idle equipment . . . And no time wasted in making adjustments . . . Fits any size ducts up to width of bender and any thickness up to 20 gauge mild steel.

No. 12 SMITH'S CLEAT BENDERS (12" Wide) \$46.20*
No. 18 SMITH'S CLEAT BENDERS (18" Wide) \$72.60*

*Prices subject to change without notice)
FOB Waukegan, Illinois

R. E. SMITH

1806 BELVIDERE ST.

WAUKEGAN, ILL.

IT'S
NEW!

millers

MODEL 99

A.C. TRANSFORMER TYPE
ARC WELDER



A moving coil transformer type industrially rated welder that meets the requirements for a compact, 250 ampere 50% duty cycle welder, with an unusually wide current range . . . from 20 to 350 amperes. Its low initial cost plus high electrical efficiency sets a new high in arc welder values.

- New compact design . . . air spaced primary and secondary coils wound with high quality double glass covered insulated wire for trouble-free long life.
- Moving coil principle produces smooth "easy-to-handle" flexible welding arc.
- Simple, fool-proof resettable current adjustments with "easy-to-read" current scale.
- Operation from either 220 or 440 volts 60 cycle single phase lines standard.
- "Dead front" construction with power switch breaking both sides of the A.C. power line for added safety.

Write

today for complete
information and
the name of your
MILLER
distributor.



millers

ELECTRIC
MANUFACTURING CO.
SINCE 1929 • APPLETON, WIS.

appointments . . .

CHARLES E. HOWES as general manager of sales for the Berger Mfg. Div., Republic Steel Corp. Mr. Howes will direct the selling of all the division's products through 26 sales branches throughout the United States. A. C. Rudy was appointed manager of the division's New York sales branch. He will be in charge of sales of lockers and shelving in the New York city area, northern New Jersey and southern Connecticut.



R. E. Davis



P. J. Dalton

ROBERT E. DAVIS as manager of the St. Louis regional sales office of The Airtemp Div., Chrysler Corp. Prior to his recent appointment, Mr. Davis managed the Chattanooga and Miami district offices. Peter J. Dalton has been named manager of the division's Detroit sales region, replacing Jerome A. Clarke who is now in charge of sales training activities at the Dayton plant.



Kwik-Way DAMPER REGULATOR SETS

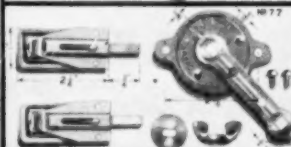
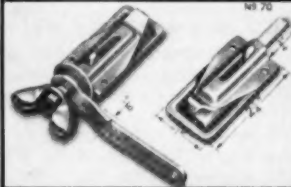
ONE SOLID
HAMMER BLOW
SETS THE BEARING



PERMANENTLY
SECURE,
RATTLE-
PROOF!

No anvil required.

Both bearings have retractable bolts for easier installation. Their convenience and time saving characteristics makes them by far the most economical sets when installed costs are considered. See your jobber or write for literature.

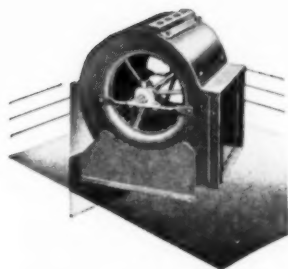


HART & COOLEY MANUFACTURING CO.

300 EIGHTH STREET

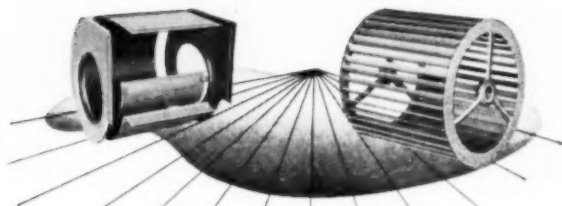
HOLLAND, MICH.

IN CANADA: HART & COOLEY MFG. CO. FORT ERIE, N., ONTARIO



MASSACHUSETTS AIR CONDITIONING FURNACE BLOWERS

Designed for manufacturers
of warm air furnaces and
air conditioning equipment.
Wheel Sizes 7 1/2" to 27"



Housing sides, cutoff
plate and scroll sheet.
Heavy gauge steel
stampings.

End spider suspension
type wheel assembly.

Write for catalog

Manufacturers of centrifugal blowers for 36 years

MASSACHUSETTS BLOWER DIVISION
The BISHOP & BABCOCK Mfg. Co.
4901 HAMILTON AVENUE CLEVELAND 14, OHIO

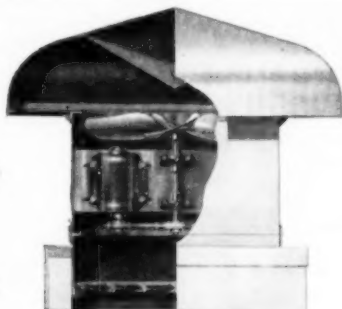
Get All the Facts
About the
Highly Efficient

BURT

"LOW TYPE"

FAN

VENTILATOR



The result of half a century of ventilating know-
how, the Burt "Low Type" includes:

MODERN ENGINEERING DESIGN
High capacity, positive weather-
proofing and high efficiency
with economical operation.

INCONSPICUOUS IN USE
Low height and modern func-
tional outline for inconspicuous
appearance.

**EASILY INSTALLED
AND SERVICED**
Fits over a standard square

curb. Easily accessible for
maintenance.

VERSATILE
Operates as exhaust fan ven-
tilator or fresh air supply
unit.

WIDE RANGE OF SIZES
Available with fans from 12"
to 60" in diameter — from
1/20 H.P. to 7 1/2 H.P.

SEE SWEET'S OR WRITE FOR BULLETIN SPV-16

FAN & GRAVITY VENTILATORS - LOUVERS - SHEET METAL SPECIALTIES

The Burt Manufacturing Company
38 E. South St., Akron 11, Ohio

Just what's wanted
in home incinerators!

IT'S CLOG-PROOF, RUST-PROOF
AND WON'T BURN OUT.....

The COLE HOT BLAST HOME INCINERATOR



meets homeowners' every de-
mand for top value and per-
formance. Here are just a few
of the Cole features:

- Economical gas operation with exclusive, patented, air-jet combustion. Genuine refractory tile lining... rust-proof, clog-proof, permanent.
- Smokeless and odorless.
- Dependable disposal of every scrap of food, however wet.

Write today for complete specifications
of both Deluxe and Standard Models.

COLE HOT BLAST MFG. CO.

3817 S. RACINE AVE. CHICAGO 9, ILLINOIS

**PROFIT
NOW!**
WITH
**GRAND
RAPIDS
FURNACE
CLEANERS**



It's easy to get a lion's share of furnace
cleaning profits when you use a Grand
Rapids Furnace Cleaner. Greater clean-
ing capacity, handling ease and practi-
cally designed groups of fur-
nace cleaning attachments
help you give better service
and clean more furnaces per
day at a higher profit.

Act now! Write today for
complete information and prices.



DOYLE VACUUM CLEANER CO.

227 Stevens St., S.W.

Grand Rapids 7, Michigan



The Swing's to

ANCHOR
OIL BURNER

**FOR THE FINEST IN
OIL HEATING EQUIPMENT**



Smart dealers everywhere are joining the Anchor line-up. They know that Anchor makes the very best in quality oil heating equipment. Anchor's Shell Combustion Head affords far greater efficiency than ordinary heads. Every single tiny oil droplet is completely consumed. These dealers know, too, that Anchor offers a franchise that tops them all. There's an Anchor conversion burner or oil-fired furnace for every installation. Why don't you get on the Anchor team? Get full details today.

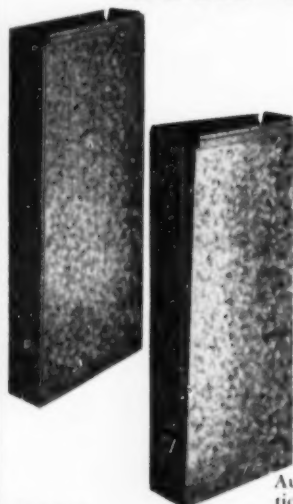
88th Year of Manufacturing the Best in Mid-West!

ANCHOR
DIVISION

STRATTON & TERSTEGGE CO., INC.

P. O. Box 311 • New Albany, Indiana

ALL YOUR NEEDS In DUCTS and FITTINGS



AJAX

- Highest Quality
- Precision Made
- Quick Assembly
- Forced Air or Gravity
- All Systems

Fittings, Pipe and Duct are die cut and formed, fit up tight and fast with AJAX Automatic Snap Lock connections.

For extra profits, use AJAX Pipe and Fittings to save you installation time and labor.

WRITE TODAY

New complete line catalog complete with helpful data.

**DIVISION OF
THE CINCINNATI SHEET METAL
& ROOFING COMPANY**

**AJAX
FURNACE
FITTING CO.**

216-20 E. Front St.
Cincinnati 2, Ohio

appointments . . .

BARTON B. DAWES as area sales manager, covering eastern Ohio and the western parts of New York, Pennsylvania, Virginia and West Virginia for Timken Silent Automatic Div., Timken-Detroit Axle Co.



B. B. Dawes



H. Haug

HOWARD HAUG as field representative for the Williams Div., Eureka Williams Corp. His territory will include Maryland, Ohio, Pennsylvania and West Virginia.

WILLIAM R. HOLMES as district manager of the Cleveland district of United States Steel Supply Div., U. S. Steel Corp. Joseph J. Codd has been named manager of the Baltimore district. Mr. Codd was formerly Baltimore office manager, in which capacity he is being succeeded by William G. Thornton.



Steel BENDING BRAKES

One-man operation



CHICAGO hand-operated bending brakes are available in a variety of standard sizes ranging from 3 to 12 feet in capacities up to 12-gauge sheet metal.

also

CHICAGO Portable Hand Brakes

CHICAGO Box and Pan Brakes

Full Particulars upon Request

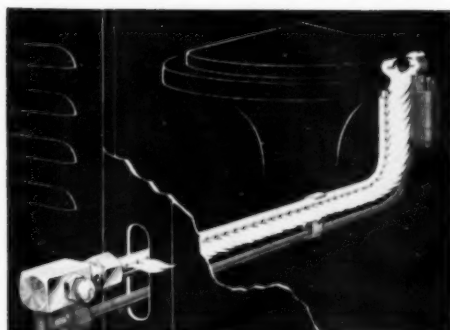
DREIS & KROMP
MANUFACTURING COMPANY

7404 S. Loomis Blvd., Chicago 36, Illinois



The MODERN LIGHTER TUBE

With the Slanting Blue Flame



OUTSIDE LIGHTING IS HERE!

for FURNACES • WATER HEATERS • BOILERS • INCINERATORS

- ★ **SAFE** as the unit it serves.
- ★ **DEPENDABLE** as the gas supply.
- ★ **SIMPLE** as the scratch of a match.
- ★ **CONVENIENT** as the touch of a button.

MODERN MATERIALS COMPANY
Northville, Michigan

No waiting for firepot castings

WHEN YOU USE

FIRELINE

Stove and Furnace Lining

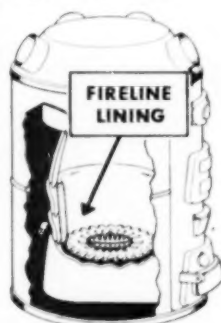
Firepot castings are hard to get . . . difficult to order and handle. That's why so many furnace men are using Fireline to repair burned out firepots.

High quality refractory in moist plastic form, Fireline can be quickly installed through the fire door without dismantling. It is baked out by the fire to form a durable, gas-tight lining that increases combustion efficiency by radiating and reflecting heat across the entire fuel bed.

Yes, Fireline will handle jobs faster and better . . . will make you friends and profits. Packed in 50- and 100-lb. drums; 5- and 10-lb. cans.

Stocked by
leading jobbers everywhere
Ask for literature and prices

FIRELINE STOVE & FURNACE LINING CO.
1816 Kingsbury St. Chicago 14, Ill.



- A practical, accurate air velocity meter for heating, air conditioning, and ventilating work. Indispensable for measuring grille velocities and air deliveries from registers and grilles; for balancing forced air heating systems, and for checking air distribution of all kinds of ventilating systems.
- Accurate velocity readings, automatically averaged over a 3" dia. free area, instantly indicated in feet per minute.
- Extension handle facilitates positioning of instrument away from the observer for readings in hard-to-reach locations, or where the observer's body would interfere with the normal air movement.
- Unique scale lock makes possible to retain scale reading when desired until the lock is released—an indispensable feature where extension rod is used to position instrument away from the observer.
- Leather case is furnished as standard equipment for added protection when the instrument is not in use and for convenience when carrying it in the pocket.

Ask your Jobber for the Florite or write for Leaflet 760.

BACHARACH INDUSTRIAL INSTRUMENT CO.
7301 PENN AVENUE • • PITTSBURGH 8, PA

**Ask Your Jobber
for**

DIECKMANN

**ELBOWS
and
SHOES**

**"An angle for every
obstacle"**

Made in 28, 26 and 24 gauge steel, hot dipped galvanized after formation. Also in Copper, Aluminum and Stainless Steel.

**Sizes 1" to 6"—Angles
10 to 90 degrees.
Always uniform in size
and angle**

One piece tapered with no protruding seams—a perfect and tight fit with any conductor pipe without soldering.

**THE FERDINAND
DIECKMANN CO.**

Established 1871
P.O. STATION B,
CINCINNATI 22, OHIO



Plain Round



Round Corrugated



Square Corrugated
Style "A"



Square Corrugated
Style "B"

MILTON SHEET METAL MACHINERY SPECIALISTS

**STOCK DELIVERY ON PEXTO, CHICAGO
BRAKES, DIACRO, ROUSSELLE PRESSES, KIDDER,
WHITNEY, ROTEX PUNCHES, REX WELDERS**

**WE CARRY A COMPLETE STOCK OF NEW &
USED HAND & POWER MACHINERY.**

**WE STOCK PUNCHES & DIES & ADAPTERS FOR
ALL PRESSES & BRAKE DIES, SHEAR BLADES &
SPOT WELDER-TIPS & HAND TOOLS.**

MILTON EQUIPMENT COMPANY

N.E. COR. 4th & Race St.

Phila. 6, Pa.

WAlnut 2-1734



Super Red Streak Model
SH—Approved by Underwriters' Laboratories
and Canadian Standards.

Added Income, Bigger Profits, The Easy Super Red Streak Way

Clean all kinds of heating plants faster and easier with a Super Red Streak Model SH Furnace Cleaner. Helps sell repairs, new plants. Both wet and dry pick-up. Cleans chimneys from basement. Special non-clog filter bag for oil plants.

Ask your wholesaler. Write for free Super Sales Plan Book.

NATIONAL SUPER SERVICE CO., INC.

1944 N. 13th St. Toledo 2, Ohio

Sales and Service in Principal Cities.
In Canada: Plant Maintenance Equipment Co.
Toronto, Montreal, Vancouver

SUPER SUCTION

SINCE 1911

"THE DRAFT HORSE OF POWER SUCTION CLEANERS"



Big Time and Money Savers for YOU! LOCKFORMERS

- Cut Over-All Fabrication Costs in Half.
- Make Pittsburghs 15 Times as Fast as you Can Make them on a Hand Bending Brake.
- Pay for Themselves Quickly Out of the Extra Profits each one Earns.

ALL MODELS IN STOCK FOR
IMMEDIATE DELIVERY!

Easy edgers and power flangers also
available for immediate shipment.

- Send for illustrated folder and more information about this and other sheet metal working equipment.



WARD MACHINERY CO.

561 W. WASHINGTON BLVD

CHICAGO 6, ILLINOIS



**Sell these lower cost
higher capacity
profit makers**

Swartwout VALVENT

**Gravity or Powered
Roof Ventilators**

6 popular throat sizes.
Write for data sheet.

The Swartwout Company
18511 Euclid Avenue
Cleveland 12, Ohio

appointments . . .

LEONARD H. WURZEL as manager of the Pittsburgh district office of Ward Leonard Electric Co. The office is located at 3015 W. Liberty Ave.

DIAMOND AMERICAN CORP. Chicago, as direct mill representative of Alrol aluminum in sheet, strip, coil and circles for Aluminum Rolling Mills, Ltd., Quebec.

BEN A. SCHWIRTZ as manager of the Cleveland sales office of The Trane Co. Roy L. Smith has joined the Philadelphia sales office, and James J. Callahan has returned to the Newark, N. J., sales office following a 21 month period of service in the Navy.

JESSE TANKEL as manager of the Accessories Div., Wm. Steinen Mfg. Co. Lawrence E. Knapp was named sales manager and Robert W. Hundley assistant sales manager. Alfred B. Huston has been appointed to represent the division in the state of Vermont and in New York state north of Newburgh. He will handle draft regulators, oil burner nozzles, nozzle kits, adapters, and flame mirrors.

J. H. HORTON as sales representative for the Niagara Machine & Tool Works. Mr. Horton, who will work out of the Philadelphia district office, has rejoined the sales staff after serving in the armed forces.

Elmo S. Moncrief

ELMO S. MONCRIEF died June 13 in St. Petersburg, Fla., where he had lived in retirement for the past five years. Mr. Moncrief was the founder of the Henry Furnace and Foundry Co., and was its president for 20 years until 1943, when the company was sold. He is survived by three sons, Richard L., Thomas E., and Elbert N., and a daughter, Mrs. Myrtle Meriam.

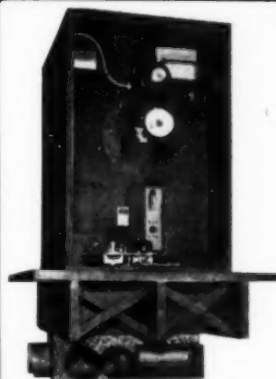
H.M. Soyster

H. M. SOYSTER, regional manager for the Toridheet Div., Cleveland Steel Products Corp., died suddenly July 2 at his home in Albion, Mich. Mr. Soyster was associated with the oil heat industry for many years and had a wide acquaintance among heating dealers in the area he supervised. Prior to his association with the Toridheet Div., he was with the Timken Silent Automatic Div., Timken-Detroit Axle Co.

J.M. Beech

J. M. BEECH died July 8 at the home of his son, Edward J. Beech, Hancock, Wis. Mr. Beech represented the International Heater Co. in Wisconsin, Iowa and northern Illinois for many years until he retired and opened his own heating business in Maywood, Ill.

GLASBY



UPSIDE-DOWN FURNACE
Model #65 gas unit for basementless homes, (front panel removed). Plenum below floor or in concrete slab. 95,000 Btu's.

GAS CONVERSION BURNER
Factory-assembled and tested. Push-button pilot lighter and safety switch. 2 models cover range 85,000 to 300,000 Btu's.

DEALERS, WRITE FOR INFORMATION ON OTHER FURNACES FOR SEMI-BASEMENT AND FULL BASEMENT HOMES

J. P. GLASBY MFG. CO., INC. 1 Montgomery Str., Belleville, N.J.



Hard to SODER — Metals
Aluminum, Cast Iron
Stainless Steel
Galvanized Metals



FLUXES
SODERING
BRAZING & WELDING
L. B. ALLEN CO. INC. Chicago 31, Ill.
6702 BRYN MAWR AVENUE, CHICAGO 31, ILL.

THERMO-VENT

Trade Mark Registered

AUTOMATIC AIR CONTROL

Controlled fresh air supply for heating unit—ventilation where it is needed—Simple to install in basement window or sill—Healthier living—70 degree temperature range—Closes automatically at lower temperatures—Sealed thermostat—Sturdy cast aluminum with screen—Treated with Iridite.



Send for illustrated folder.
DAMP-VENT CO.

P. O. Box 203R
Bettendorf, Iowa

BIG PROFITS FOR ACTIVE DISTRIBUTORS

DIAMOND GRILLES
TRADE MARK
Look Better — Last Longer
Superior workmanship and finish in heavy-gauge metal assures installations of lasting beauty. Most designs stamped in any thickness, up to one-fourth inch, from any metal. Catalog No. 36 illustrates all designs and gives complete working data. Free on request.
Diamond Manufacturing Co.
Box 34 Wyoming, Pa.
Sales representatives in all principal cities



ORNAMENTS STAMPINGS & SPINNINGS

Zinc Ornaments Available From Stock. Copper, brass, bronze, aluminum and stainless steel ornaments made up promptly.

If you don't have catalog K, send for it NOW.

MILLER & DOING

89 ADAMS STREET

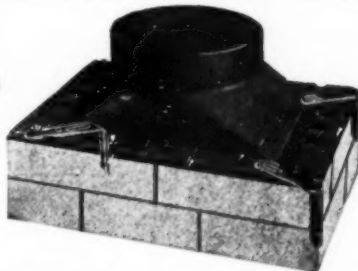
BROOKLYN, N. Y.

ADAMS CHIMNEY CAPS

(CAST IRON)

For 6, 7, 8, 9 & 10"

Chimney
Extensions



Buy Adams Known Quality

THE ADAMS COMPANY

BRIDGE STREET • Established 1883 • DUBUQUE, IOWA

BRAUER has

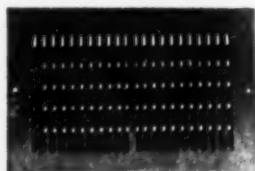
REPAIR PARTS for all FURNACES
BOILERS, STOVES • Guaranteed to FIT

A. G. BRAUER Supply Co.

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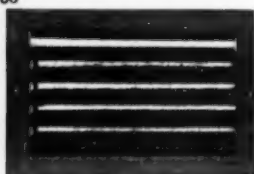
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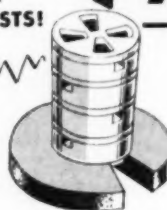
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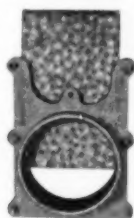
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COPPER SHEETS
GALVANIZED RAIN-CARRYING EQUIPMENT —
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The exact amount of heat anticipation is built-in



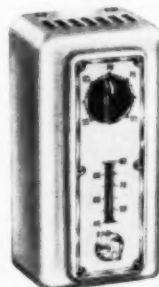
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Better Heat Anticipation —

Heat anticipation cannot vary due to high resistance connections, corrosion of contacts, mis-adjustment or tampering.



Series 130

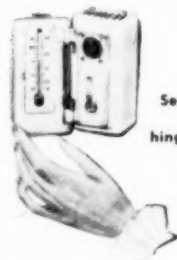
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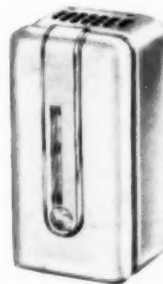
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City _____ Zone _____ State _____
Kind of Work _____ Birthday _____ (DAY) (MONTH)

